LIST OF SUPERNOVAE
DISCOVERED SINCE 1885

(Interim Report to the Committee for Research on Supernovae within Commission 28 of the International Astronomical Union and to the National Science Foundation, Washington, D. C.)

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The Search Program

The first systematic search for supernovae was started by the author at the California Institute of Technology in Pasadena in December 1933 and was subsequently carried on at the Mount Wilson and Palomar Observatories until the summer of 1942. By this time 19 supernovae had been discovered. The further search was interrupted by World War II. Some sporadic discoveries were made during the decade following World War II, until in 1954 the search was seriously renewed with the 18-inch Schmidt telescope on Palomar Mountain. In 1959 the 48-inch Schmidt telescope became available and it has been used in particular for the systematic survey of some rich clusters of galaxies which contain several tens of thousands of galaxies. The search for and the research on supernovae was finally organized on an international basis at the General Assembly of the I. A. U. in Berkeley, California, where in August 1961 a committee for the investigation of supernovae was established within the Commission 28 (Extragalactic Nebulae) of the I. A. U. At the present time observatories in Argentina, Belgium, France, Germany, Hungary, Italy, Mexico, The Soviet Union, South Africa, Switzerland, and the United States of America are cooperating with this Committee. Preliminary results have been communicated to the members of the Committee in seven Circular Letters which were issued in the period from December 1960 until November 1963.

Altogether 152 supernovae have been discovered and clearly identified as such in the period from 1885 until July 1, 1964. A list of these supernovae is herewith presented in the enclosed Table.

The following designations and abbreviations are used in the Table. The first column gives the recently adopted designating number

of the supernovae (SN), In the second column the galaxies which are not anonymous (Anon) are identified by their NGC and IC numbers, the latter being marked with an asterik. In the columns 4 and 5 the right ascension and declination for the epoch of 1950.0 of the galaxies are given in which the respective supernova appeared. m_p is the apparent photographic magnitude of each galaxy, and V_s is its heliocentric symbolic velocity of recession $V_s = c\Delta\lambda/\lambda$. Cluster membership of the galaxies involved is of course somewhat uncertain in the cases of the nearer clusters such as the Ursa Major Cloud and the Virgo cluster. The types of the supernovae are determined from their spectral features rather than from the light curves, which are far less characteristic. The time t_{max} of maximum brightness and the corresponding apparent photographic magnitude m_{max} are in many cases quite uncertain. In the last column the numbers Z of the supernovae are given as they were originally used in my circular letters.

In order to avoid unnecessary work of duplication check marks (+) have been inserted in the column of V_s in the case of those galaxies for which I have obtained readable spectra with the 200-inch telescope. The reductions of these spectra and the resulting values for V_s will be published in a more definitive formulation of the data listed in the accompanying Table. The angular distances in right ascension and declination of the supernovae from the centers of their parent galaxies will then be also given.

More extended and comprehensive reviews on the spectral classification of the various types of supernovae, their light curves and various statistical analyses will presently be available in two articles by the present writer which are respectively to appear in Volume 8, Stellar

Structure, of the Kuiper compendium, Stars and Stellar Systems (University of Chicago Press), as well as in the Annales d'Astrophysique. (The same article will also be reprinted in a monograph by the Centre National de la Recherche Scientifique, which will contain all of the reports which were made at the Supernova Symposium, Observatoire de Haute Provence in September 1963).

Since the start of the systematic search for supernovae in December 1933 a considerable body of observational material has accumulated which has never been properly presented in the general scientific literature. In order to fill this gap I am engaged in writing a monograph on supernovae and I shall appreciate it if all of the members of the Committee for Research on Supernovae will contribute all of the important data which I do not have at my disposal. It is hoped that the members of the Committee will be able to meet in Hamburg in August or September 1964 to discuss the suggestions here made and to check the data presented in the enclosed Table in order to make possible a definitive representation of the data which are available on supernovae.

Coordinates of the parent galaxies of the supernovae Z = 6, 9, 29, and 33 which are given incorrectly in the review article, Vol. 51, Handbuch der Physik, Springer Verlag 1958, p. 774 are corrected in the attached Table.

Pasadena
July 1, 1964

F. Zwicky
Chairman of the Committee for
Research on Supernovae
(Commission 28, I. A. U.)

SN	Galaxy	Type	R.A.	Decl.	m_p	V_s	Cluster
			h m				
1885a	224	Sb	0-40.0	+41° 0'	4.5	- 266	Local Group
1895a	4424	SBb pec.	12-24.6	+ 9°42'	12.5		Virgo
1895b	5253	Irr	13-37.1	-31°23!2	11.0	+ 432	
1901a	2535	SBc	8- 8.2	+25°21!6	12.7	+4243	
1901b	4321	Sc	12-20.4	+16° 6'	10.6	+1617	Virgo
1907a	4674	S	12-43.4	-08°22'	14.5		
1909a	5457	Sc	14- 1.4	+54°35'	8.9	+ 247	
1912a	2841	Sb	9-18.6	+51°12'	10.6	+ 584	
1914a	4321	Sc	12-20.4	+16° 6'	10.6	+1617	Virgo
1915a	4527	Sc	12-31.6	+ 2°56'	11.3	+1727	Virgo
1917a	6946	Sc	20-33.9	+59°58'	11.1	+ 38.0	
1919a	4486	Eo	12-28.3	+12°40'	10.1	+1290	Virgo
1920a	2608	SBc	8-32.2	+28°38'	13.6	+2119	
1921a	4038/39	S pec	11-59.3	-18°35'	11.0	+1673	

Discovered Since 1885

SN	Type	m_{max}	Found	t_{max}	Discoverer	Z
1885a	(I)	7.2	1885	Aug., 1885	E. Hartwig	1
1895a		11.1	1925	Mar., 1895	M. Wolf	2
1895b		8.0	1895	July, 1895	W. P. Fleming	3
1901a		14.7	1923	Jan., 1901	K. Reinmuth	4
1901b		11.9	1917	Mar., 1901	H. D. Curtis	5
1907a		(13.5)	1936	May, 1907	W. J. Luyten	6
1909a		(12.1)	1909	Feb., 1909	M. Wolf	7
1912a			1917	Feb., 1912	F. Pease H. D. Curtis	8
1914a		< 14.0	1917	Mar., 1914	H. D. Curtis	9
1915a		< 14.0	1917	Mar., 1915	H. D. Curtis	10
1917a		12.9	1917	July, 1917	G. Ritchey	11
1919a		11.5	1919	Feb., 1919	I. Balanowski	12
1920a		11.0	1920	- , 1920	M. Wolf	13
1921a			1939	Mar., 1921	E. P. Hubble J. C. Duncan	14

SN	Galaxy	Type	R.A.	Decl.	m_p	V_s	Cluster
			h m				
1921b	3184	Sc	10-15.2	+41°40'	11.8	+ 443	
1921c	3184	Sc	10-15.2	+41°40'	11.8	+ 443	
1923a	5236	Sc	13-34.3	-29°37'	8.0	+ 491	
1926a	4303	SBc	12-19.4	+ 4°45'	10.9	+1671	Virgo
1926b	6181	Sc	16-30.1	+19°56'	12.6	+2158	
1934a	4719*	S	18-29.0	-56°46'	13.9		
1936a	4273	Sc	12-17.4	+ 5°37'	12.4	+2302	Virgo
1936b	Anon	SBc	1-18.6	+15°26'	15.6		
1937a	4157	Sc	12- 8.6	+50°46'	12.0		Ursa Major
1937b	Anon	SBc	22- 7.8	-22°56!3	14.8		
1937c	4182*	Sc	13- 3.4	+37°52!1	13.5	(+)	
1937d	1003	Sc	2-36.1	+40°39'	13.1	+ 585	
1937e	1482	Sa pec	3-52.4	-20°39'	14.4		
1937f	3184	Sc	10-15.2	+41°40'	11.8	+ 443	

Discovered Since 1885

SN	Type	m_{max}	Found	t_{max}	Discoverer	Z
1921b		11.0	1939	Apr., 1921	F. Zwicky	15
1921c		11.0	1939	Dec., 1921	R. Jones	16
1923a	(V)	14.0	1923	May, 1923	C. Lampland	17
1926a		12.8	1926	May, 1926	M. Wolf K. Reinmuth	18
1926b		(14.8)	1941	June, 1926	A. van Maanen	19
1934a		(13.6)	1938	Oct., 1934	C. D. Boyd	20
1936a	II	14.2	1936	Jan., 1936	E. P. Hubble G. Moore	21
1936b		< 15.1	1938	Sept., 1936	F. Zwicky	22
1937a	(II)	(14.4)	1937	Feb., 1937	F. Zwicky	23
1937b		(15.3)	1938	Aug., 1937	F. Zwicky	24
1937c	I	8.2	1937	Aug., 1937	F. Zwicky	25
1937d	I	12.8	1937	Sept., 1937	F. Zwicky	26
1937e		(14.0)	1938	Nov., 1937	F. Zwicky	28
1937f		13.5	1938	Dec., 1937	F. Zwicky	27

SN	Galaxy	Type	R.A.	Decl.	m_p	V_s	Cluster
			h m				
1938a	Anon	SBc	2-34.6	+34°13'	15.0	+4800	
1939a	4636	E_1	12-40.3	+ 2°57'	10.8	+ 973	Virgo
1939b	4621	E_5	12-39.5	+11°55'	11.4	+ 414	Virgo
1939c	6946	Sc	20-33.9	+59°58'	11.1	+ 38	
1939d	Anon	Sb	0-55.0	- 5°16'	14.5		
1940a	5907	Sb	15-14.6	+56°31'	11.8	+ 553	
1940b	4725	SBb	12-48.1	+25°46'	10.8	+1114	Ursa Major
1940c	1099*	Sa	15- 5.8	+56°41'	14.5		
1940d	4545	Sb	12-32.4	+63°48'	13.5		
1940e	253	Sc	0-45.1	-25°34'	7.0	- 81	
1941a	4559	Sc	12-33.5	+28°14'	10.7	+ 856	
1941b	3254	Sc	10-26.5	+29°45'	12.6	+1226	
1941c	4136	Sc	12- 6.7	+30°12'	12.1	+ 445	
1945a	5195	Irr.	13-27.9	+47°31'	11.1	+ 542	

Discovered Since 1885

SN	Type	m_{max}	Found	t_{max}	Discoverer	Z
1938a		14.5	1938	Oct., 1938	F. Zwicky	29
1939a	(I)	12.5	1939	Jan., 1939	F. Zwicky	30
1939b		11.8	1939	May, 1939	F. Zwicky	31
1939c		13.2	1939	June, 1939	F. Zwicky	32
1939d		16.0	1939	Nov., 1939	F. Zwicky	33
1940a	II	< 13.0	1940	Feb., 1940	J. J. Johnson	34
1940b	II	12.6	1940	May, 1940	J. J. Johnson	35
1940c		< 16.3	1940	May, 1940	F. Zwicky	36
1940d		< 15.0	1940	July, 1940	J. J. Johnson	37
1940e	I	< 14.0	1940	Nov., 1940	F. Zwicky	38
1941a	II	13.5	1941	Feb., 1941	R. Jones	39
1941b		15.0	1941	Mar., 1941	J. J. Johnson	40
1941c	II	16.8	1941	Apr., 1941	R. Jones	41
1945a	I	11.2	1945	Apr., 1945	M. L. Humason	42

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SN	Galaxy	Type	R. A.	Decl.	m_p	V_s	Cluster
			h m				
1946a	3977	(Eo pec)?	11-53.6	+55°40'	13.8		Ursa Major
1946b	4632	Sc	12-40.0	+ 0°11'	12.1		Virgo
1947a	3177	Sb	10-13.9	+21°22'	12.8	+1220	
1948a	4699	Sb	12-46.5	- 8°24'	10.5	+1511	Virgo
1948b	6946	Sc	20-33.9	+59°58'	11.1	+ 38	
1950a	4051*	E_1	12-58.5	+28°17'	14.8	+4932	Coma
1950b	5236	Sc	13-34.3	-29°37'	8.0	+ 491	
1954a	4214	Irr.	12-13.1	+36°36'	10.7	+ 295	
1954b	5668	S	14-30.9	+ 4°40'	12.4	+1770	
1954c	5879	Sb	15- 8.4	+57°12'	12.1	+ 876	Ursa Major
1955a	4157	Sc	12- 8.6	+50°46'	12.0		Ursa Major
1955b	Anon	SBa pec.	1- 5.0	-13°29!5	15.7		A-Cluster
1955c	23	Sb	0- 7.3	+25°39'	12.7	+4568	
1955d	Anon	S pec.	0-49.5	-16°41'	15.1		

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SN	Type	m_{max}	Found	t_{max}	Discoverer	Z
1946a		< 18.0	1946	May, 1946	E. P. Hubble	43
1946b	(II)	< 15.7	1946	May, 1946	E. P. Hubble	44
1947a	II	< 16.5	1947	Mar., 1947	E. P. Hubble	45
1948a		< 17.0	1948	Mar., 1948	E. P. Hubble	46
1948b	(II)	< 14.9	1948	July, 1948	N. U. Mayall	47
1950a	I	(14.5)	1950	Mar., 1950	M. L. Humason	48
1950b		(14.5)	1950	Mar., 1950	G. Haro	49
1954a	(I)	9.0	1954	Apr., 1954	P. Wild	50
1954b	I	12.0	1954	May, 1954	P. Wild	51
1954c	II	14.9	1954	Sept., 1954	P. Wild	52
1955a		< 16.0	1964	Apr., 1955	F. Zwicky	151
1955b		15.8	1955	Sept., 1955	F. Zwicky	53
1955c		< 16.0	1958	Sept., 1955	A. R. Sandage	59
1955d		15.5	1957	Nov., 1955	G. Haro	

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SN	Galaxy	Type	R.A.	Decl.	m_p	V_s	Cluster
1956a	3992	SBc	11-55.0	+53°39'	11.2	+1059	Ursa Major
1957a	2841	Sb	9-18.6	+51°12'	10.5	+ 584	
1957b	4374	E	12-22.6	+13°10'	10.9	+ 954	Virgo
1957c	1365	SB	3-31.8	-36°18'	11.2	+1672	Fornax
1957d	5236	Sc	13-34.3	-29°37'	8.0	+ 491	
1958a	Anon	Eo	15-58.6	+19°52'	17.5		
1958b	Anon	S0	2-34.5	+ 1°07'	16.0		
1959a	1350	SBc	3-29.1	-33°48'	11.8	+1780	Fornax
1959b	4921	SBc	12-59.2	+28°07'	14.5	+5460	Coma
1959c	Anon	SBc	13- 8.8	+ 3°40'	16.0	+2994	
1959d	7331	Sb	22-34.8	+34°10'	11.2	+ 780	
1959e	4321	Sc	12-20.4	+16° 6'	10.6	+1617	Virgo
1959f	Anon	SBc	2-47.2	- 0°43'	15.0		
1960a	Anon	Sc	2-32.8	+ 1°53'	16.5		

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SN	Type	m_{max}	Found	t_{max}	Discoverer	Z
1956a	I	12.5	1956	Mar., 1956	H. S. Gates	54
1957a	II	< 14.0	1957	Mar., 1957	M. Schürer	55
1957b		< 13.0	1957	May, 1957	G. Romano H. S. Gates	56
1957c		< 16.5	1957	Oct., 1957	H. S. Gates	57
1957d		< 15.0	1957	Dec., 1957	H. S. Gates	58
1958a		< 19.0	1962	Aug., 1958	F. Zwicky	114
1958b		< 18.0	1960	Dec., 1958	M. L. Humason	80
1959a		< 16.0	1959	Jan., 1959	H. S. Gates	60
1959b		< 18.5	1959	May, 1959	M. L. Humason	61
1959c	I	14.1	1959	May, 1959	M. L. Humason	62
1959d	II	13.0	1959	June, 1959	M. L. Humason	63
1959e	I	<< 17.5	1960	Sept., 1959	M. L. Humason	67
1959f		< 18.5	1959	Dec., 1959	M. L. Humason	64
1960a		< 16.5	1960	Jan., 1960	M. L. Humason	76

SN	Galaxy	Type	R. A.	Decl.	m_p	V_s	Cluster
1960b	Anon	Sb	12-32.2	+ 9°17'	15.5		
1960c	Anon	Sb	12-04.6	+17°16'	15.5		
1960d	Anon	SBc	8-17.4	+21°02'	15.5	+5008	Cancer
1960e	Anon	Sa	12-15.1	+48°10'	17.8		
1960f	4496	SBc	12-29.6	+ 4°12'	12.0	+1770	(Virgo)
1960g	Anon	Sc	11-28.5	+18°40'	16.0		
1960h	4096	Sc	12-03.5	+47°45'	12.2	(+)	
1960i	Anon	SBb	12-24.4	+48°34'	14.5	(+)	
1960j	4375	Sa	12-22.2	+28°50'	14.0	+9165	
1960k	Anon	SBc	22-37.7	+34°08'	15.5		
1960*l*	7177	Sb	21-58.5	+17°29'	12.1	+1105	
1960m	2565	SBb	8-16.9	+22°10'	13.5	+3684	Cancer
1960n	Anon	Sc	8-23.2	+21°37'	15.0	+4349	Cancer
1960o	Anon	Sc	23-33.9	+27°39'	17.0		

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SN	Type	m_{max}	Found	t_{max}	Discoverer	Z
1960b		16.0	1960	Feb., 1960	C. E. Kearns	65
1960c		17.0	1960	Feb., 1960	M. L. Humason	66
1960d		< 16.0	1960	Mar., 1960	M. L. Humason	68
1960e		16.5	1961	Mar., 1960	M. L. Humason	90
1960f		11.0	1960	Apr., 1960	M. L. Humason	69
1960g		< 17.5	1960	Apr., 1960	M. L. Humason	70
1960h		< 14.5	1960	June, 1960	P. Wild M. L. Humason	71
1960i		< 18.5	1960	June, 1960	M. L. Humason	72
1960j		< 18.5	1960	June, 1960	M. L. Humason	73
1960k		< 19.0	1960	June, 1960	M. L. Humason	74
1960*l*		< 16.0	1960	Aug., 1960	M. L. Humason	75
1960m	I	< 17.5	1960	Aug., 1960	A. M. Gomes	77
1960n	I	< 16.5	1960	Sept., 1960	A. M. Gomes	78
1960o		< 18.5	1960	Nov., 1960	M. L. Humason	79

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1960p	Anon	Sc	1-03.5	+31°08'	17.5	(+)	Pisces
1960q	Anon	Sb	1-33.4	- 5°45'	18.5	(+)	
1960r	4382	S0	12-22.8	+18°28'	10.5	+ 773	Virgo
1961a	Anon	SBb	2-41.5	+ 0°34'	16.1		
1961b	2363*	SBc	8-22.9	+19°37'	15.2	(+)	Cancer
1961c	Anon	Sc	2-12.3	+40°53'	16.4		
1961d	Anon	Eo	12-48.5	+28°06'	14.7	+7638	Coma
1961e	Anon	S0	15-15.1	+ 5°14'	15.7	+12900	Shane Cloud
1961f	3003	Sc irr.	9-45.6	+33°39'	12.5	+1476	
1961g	Anon	Sb	10-19.6	+21°29'	16.3		
1961h	4564	E_7	12-34.0	+11°43'	12.1	(+)	Virgo
1961i	4303	SBc	12-19.3	+ 4°45'	10.9	+1671	Virgo
1961j	Anon	Sc	16-09.8	+29°42'	19.5		
1961k	Anon	Sc	12- 0.8	+16°47'	14.6		

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SN	Type	m_{max}	Found	t_{max}	Discoverer	Z
1960p		< 17.5	1960	Nov., 1960	A. M. Gomes	81
1960q		< 17.5	1960	Dec., 1960	M. L. Humason	82
1960r	I	12.0	1961	Dec., 1960	L. Rosino H. S. Gates	86
1961a		< 19.0	1961	Jan., 1961	M. L. Humason	83
1961b		< 18.5	1961	Jan., 1961	M. L. Humason	84
1961c		18.2	1961	Jan., 1961	M. L. Humason	85
1961d	I	16.5	1961	Jan., 1961	C. E. Kearns	87
1961e		17.0	1961	Jan., 1961	A. M. Gomes	88
1961f	IV	< 15.0	1961	Feb., 1961	P. Wild	89
1961g		18.2	1961	May, 1961	M. L. Humason	91
1961h	I	11.0	1961	May, 1961	G. Romano	92
1961i	III	13.0	1961	June, 1961	M. L. Humason	93
1961j	(III)	16.0	1961	June, 1961	C. E. Kearns	94
1961k		< 16.3	1961	June, 1961	M. L. Humason	95

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SN	Galaxy	Type	R. A.	Decl.	m_p	V_s	Cluster
1961ℓ	3221	Sc irr.	10-19.6	+21°50'	14.3	(+)	
1961m	Anon	Sb	1-07.2	+32°06'	14.3		Pisces
1961n	5342*	Eo	23-36.1	+26°44'	15.3	(+)	
1961o	Anon	Sc	2-23.5	+43°24'	17.0		
1961p	Anon	Sc	2-32.5	+37°25'	14.2	(+)	
1961q	550	Sb	1-24.1	+ 1°46'	13.4	(+)	
1961r	Anon	Eo	1-07.2	+32°39'	14.3		Pisces
1961s	Anon	Sa	10-18.3	+21°58'	15.8	(+)	
1961t	Anon	Irr	9-36.0	+33°40'	19.5		
1961u	3938	Sc	11-50.1	+44°24'	11.6	+ 874	
1961v	1058	Sc	2-40.2	+37°08'	12.7	+ 440	
1962a	Anon	E	13-04.3	+28°08'	15.6	(+)	Coma
1962b	Anon	Sa	15-20.7	+29°57'	14.3	(+)	Cor. Bor.
1962c	Anon	Sc	16-02.1	+17°43'	18.5		

Discovered Since 1885

SN	Type	m_{max}	Found	t_{max}	Discoverer	Z
1961ℓ		< 17.5	1961	July, 1961	P. Wild	101
1961m		17.0	1961	Aug., 1961	C. E. Kearns	97
1961n		16.8	1961	Sept., 1961	M. L. Humason	98
1961o		17.0	1961	Sept., 1961	M. L. Humason	99
1961p		15.0	1961	Sept., 1961	P. Wild	100
1961q		17.2	1961	Oct., 1961	M. L. Humason	104
1961r		17.0	1961	Oct., 1961	M. L. Humason	103
1961s		18.3	1961	Nov., 1961	C. E. Kearns	102
1961t		< 17.5	1962	Nov., 1961	H. S. Gates	110
1961u	II	< 14.0	1961	Dec., 1961	P. Wild	105
1961v	V	12.2	1961	Dec., 1961	P. Wild	96
1962a	I	16.5	1962	Jan., 1962	F. Zwicky	106
1962b	I	< 17.0	1962	Jan., 1962	F. Zwicky	108
1962c		< 18.0	1962	Jan., 1962	F. Zwicky	109

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SN	Galaxy	Type	R.A. h m	Decl.	m_p	V_s	Cluster
1962d	Anon	Irr.	10-30.8	-27°39'	17.4		
1962e	Anon	Eo	11-12.4	+26°10'	17.5		
1962f	Anon	SBc	8-14.5	+21°50'	14.5	(+)	Cancer
1962g	Anon	S0	15-26.0	+29°11'	16.5		
1962h	4237*	SBb	13-21.7	-20°52'	13.8	(+)	
1962i	Anon	E	13- 0.5	+27°47!5	19.0	(+)	Coma
1962j	6835	Sa	19-51.8	-12°42'	13.0	(+)	
1962k	1090	S	2-44.0	- 0°27'	12.8	(+)	
1962l	1073	SBc	2-41.2	+ 1°10'	12.0	+1874	
1962m	1313	SB	3-17.6	-66°40'	10.8		
1962n	Anon	Sc	15-19.0	+26°32'	17.0	(+)	
1962o	Anon	E	3-21.2	+39°51'	18.6	+14150	
1962p	1654	E	4-43.3	- 2°11'	14.2		
1963a	Anon	SBc pec.	15-24.9	+26°37'	17.5	+10400	

Discovered Since 1885

SN	Type	m_{max}	Found	t_{max}	Discoverer	Z
1962d		< 16.0	1962	Feb., 1962	F. Zwicky	107
1962e		< 19.0	1962	Mar., 1962	K. Rudnicki	111
1962f		< 17.0	1962	Apr., 1962	J. Berger	112
1962g		< 19.0	1962	May, 1962	F. Zwicky	113
1962h	(II)	13.0	1962	June, 1962	E. Chavira	115
1962i		16.5	1962	May, 1962	J. Berger	116
1962j	I	13.0	1962	Aug., 1962	P. Wild	117
1962k		< 17.5	1962	Sept., 1962	K. Rudnicki	118
1962*l*	I	12.0	1962	Nov., 1962	L. Rosino G. Haro E. Chavira	119
1962m	(II)	10.0	1962	Nov., 1962	J. L. Sersic	120
1962n		< 17.0	1962	Dec., 1962	F. Zwicky	121
1962o		19.8	1962	Nov., 1962	F. Zwicky	122
1962p		< 14.5	1962	Sept., 1962	L. Rosino	145
1963a		18.1	1963	Jan., 1963	F. Zwicky	123

SN	Galaxy	Type	R.A.	Decl.	m_p	V_s	Cluster
1963b	Anon	Sb pec.	15-09.0	+ 5°26'	16.3	+11800	Shane Cloud
1963c	Anon	E	12-55.4	+28°09!5	15.5	+6050	Coma
1963d	4146	SBa	12- 7.8	+26°42'	13.8	(+)	
1963e	1703*	Sb	1-23.9	- 1°54'	14.9	+5688	Cl 0123-0138
1963f	Anon	Sc	15-20.3	+28°01'	17.7	(+)	Cor. Bor.
1963g	3112*	Sc	12-15.3	+26°18'	15.3	(+)	
1963h	Anon	Sb	15-19.9	+ 5°34'	15.2	(+)	Shane Cloud
1963i	4178	Sc	12-10.2	+11°01'	12.9	+ 233	(Virgo)
1963j	3913	Sc	11-48.0	+55°38'	14.7	(+)	
1963k	3656	Sb pec.	11-20.8	+54°07'	13.0	(+)	
1963l	Anon	SBc	2-44.7	+37°21'	15.7	(+)	
1963m	Anon	S0 pec.	12-55.5	+28°20'	16.3		(Coma)
1963n	536	SBb	1-23.5	+34°27'	14.1	(+)	
1963o	5905	SBc	15-14.1	+55°42'	13.1		

Discovered Since 1885

SN	Type	m_{max}	Found	t_{max}	Discoverer	Z
1963b	I	17.0	1963	Jan., 1963	F. Zwicky	124
1963c	I	15.6	1963	Jan., 1963	F. Zwicky	125
1963d	I	15.0	1963	Jan., 1963	L. Rosino	126
1963e	I	16.5	1963	Jan., 1963	M. Mendez	127
1963f		18.5	1963	Mar., 1963	F. Zwicky	128
1963g		< 15.8	1963	Feb., 1963	N. E. Kurockin	129
1963h		(18.5)	1963	Mar., 1963	F. Zwicky	130
1963i	I	< 14.5	1963	May, 1963	G. V. Zaytsewa	131
1963j	I	12.5	1963	May, 1963	F. Zwicky P. Wild	132
1963k		15.0	1963	June, 1963	Ch. Bertaud	133
1963l	I	15.0	1963	June, 1963	G. Reaves	134
1963m		16.5	1963	June, 1963	G. Reaves	135
1963n	(II)	17.7	1963	June, 1963	H. S. Gates	136
1963o		15.0	1963	Aug., 1963	P. Wild	137

List of Supernovae

SN	Galaxy	Type	R.A.	Decl.	m_p	V_s	Cluster
			h m				
1963p	1084	Sc	2-43.6	- 7°47'	11.2	+1558	
1963q	1195*	S0	16-04.4	+17°19'	15.4		
1963r	Anon	S0	2-33.2	+35°44'	17.5	(+)	
1963s	Anon	S0	1-21.0	+ 1°18'	15.8		
1963t	Anon	S0	1-21.6	+33°47'	17.7		
1963u	Anon	SBc	9-50.3	+36°18'	15.3	(+)	
1963v	Anon	Irr.	2-32.0	- 6°18'	16.5		
1964a	3631	Sc	11-18.3	+53°28'	11.8	+1087	
1964b	Anon	S0	3-14.8	+40°11'	16.3	(+)	Perseus
1964c	Anon	S0	16- 3.8	+17°35'	16.5	(+)	
1964d	4887	S0	12-58.1	-14°24'	14.8		Virgo South
1964e	Anon	SBc pec.	11-56.6	+52°59'	13.7	(+)	
1964f	4303	SBc	12-19.3	+ 4°45'	10.9	+1671	Virgo

Discovered Since 1885

SN	Type	m_{max}	Found	t_{max}	Discoverer	Z
1963p	I	14.0	1963	Sept., 1963	P. Wild	138
1963q		< 17.0	1963	Sept., 1963	G. Reaves	139
1963r		16.8	1963	Oct., 1963	C. Kowal	140
1963s		15.0	1963	Dec., 1963	E. Chavira	141
1963t		17.5	1963	Oct., 1963	C. Kowal	142
1963u	(VI)?	15.0	1963	Dec., 1963	C. Kowal	143
1963v		16.0	1963	Sept., 1963	C. Kowal	144
1964a	(V)	17.0	1964	Feb., 1964	P. Wild	146
1964b	I	< 16.7	1964	Feb., 1964	C. Kowal	147
1964c	I	< 17.3	1964	Feb., 1964	F. Zwicky	148
1964d		16.3	1964	Feb., 1964	G. Haro	149
1964e	I	< 13.2	1964	Mar., 1964	M. Lovas	150
1964f	I	< 14.0	1964	June, 1964	L. Rosino	152

Second List*

Compact Galaxies and compact parts of Galaxies

Eruptive Galaxies and Post-eruptive Galaxies

by
F. Zwicky
Mount Wilson and Palomar Observatories
Carnegie Institution of Washington
California Institute of Technology

D = direct photograph with the 200" telescope has been obtained.

S = spectrum with the prime focus spectrograph of the Hale telescope has been obtained.

Position 1950 h	m	o	'	D	S	
01	19.5	- 01	18	x	x	
01	20.6	+ 34	19	x	x	
01	22.3	- 01	49	x		
02	34.6	+ 20	56			
02	38.7	+ 04	00	x		(Star?)
02	39.5	+ 04	03	x		
04	15.1	+ 01	25		x	
04	19.8	- 03	45			
04	20.5	+ 07	01			
04	21.9	- 00	51			
04	26.4	- 01	58			
04	28.1	+ 00	33			
04	28.5	+ 07	31			
04	30.5	+ 05	15			
04	31.6	- 08	41	x	x	NGC 1614
04	31.9	- 02	51			
04	32.7	- 01	50			
04	35.9	+ 11	09			
04	36.8	+ 01	02			

*The first list was presented at the Hamburg IAU Assembly within Commission 28, in August 1964.

Position 1950				D	S	
h	m	o	'			
04	36.8	- 02	54			
04	40.6	+ 00	40			
04	41.0	- 08	37			
04	47.0	+ 03	15			
04	54.2	- 06	53			
04	55.2	- 04	10		x	
04	57.6	- 01	34			
04	57.7	- 01	33			
04	59.0	+ 03	30			
05	03.0	+ 10	48			
05	04.7	+ 09	23		x	
05	05.2	+ 00	36			
05	07.7	- 00	47	x	x	
05	08.3	- 02	45			
05	08.7	+ 01	28			
05	14.4	+ 00	52			
05	15.2	+ 00	10			
05	16.4	+ 02	34			
05	24.2	- 01	15			
05	34.8	+ 13	31			
05	53.1	+ 03	24			
05	53.7	+ 07	50			
06	00.4	+ 07	50			
07	38.8	+ 45	33	x	x	Star + Galaxy
10	12.5	+ 21	20			
10	19.7	+ 21	46			
10	25.1	+ 22	00			
10	25.2	+ 19	45			

Position 1950				D	S	
h	m	o	'			
11	11.5	+ 30	36			
11	12.8	+ 32	04			
11	13.1	+ 28	50			
11	15.5	+ 30	40			
11	34.3	+ 18	09			
11	36.3	+ 45	53			
11	48.6	+ 43	22	x	x	
11	51.0	+ 43	44			
12	02.6	+ 42	35	x	x	
12	07.0	+ 17	17		x	
12	10.8	+ 13	27			
12	21.6	+ 04	49			
12	21.8	+ 05	21			
12	22.1	+ 04	32			
12	23.6	+ 07	56			
12	24.3	+ 16	33			
12	26.0	+ 05	51			
12	29.8	+ 16	35			
12	32.2	+ 14	50			
12	56.2	+ 27	51			
13	56.6	+ 37	40	x	x	
14	35.5	+ 29	02	x	x	
14	48.9	+ 35	45	x	x	
14	49.3	+ 35	45	x	x	
15	04.2	+ 04	16	x	x	Galaxy + Star
15	14.1	+ 43	21	x	x x	
15	58.7	+ 18	58	x	x	Star + Galaxy
16	56.3	+ 38	17	x		Star ?
16	59.8	+ 33	38	x		

Position 1950				D	S
h	m	o	'		
17	27.1	+ 50	15		x
19	53.1	+ 09	24		
20	04.7	+ 05	35		
20	13.4	+ 06	56		
20	20.1	+ 10	03		
20	20.7	+ 00	30		
20	24.4	- 02	26		
20	25.2	+ 10	35		
20	30.7	+ 09	04		
20	32.3	+ 09	47		
20	33.0	+ 16	45		
20	34.8	+ 13	03		
20	39.9	+ 11	23		
20	40.2	+ 07	22		
20	43.0	+ 12	46		
20	45.6	- 00	06		
20	46.9	+ 08	16		
20	48.4	- 00	30		
20	49.7	+ 09	10		
20	55.0	+ 16	56		
20	57.2	- 02	05		
21	02.2	- 00	24		
21	04.3	- 01	03		
21	05.1	+ 17	45		
21	05.1	+ 03	41		
21	05.2	+ 03	40		
21	06.3	+ 12	16		
21	08.0	+ 18	34		

Position 1950				D	S
h	m	o	'		
21	08.8	+ 06	34		
21	10.3	+ 13	47		
21	10.9	+ 02	34		
21	11.4	+ 02	22		
21	12.0	+ 21	20		
21	12.3	+ 10	39		
21	12.7	+ 01	59		
21	12.7	+ 06	55		
21	12.7	+ 11	28		
21	12.7	+ 12	27		
21	14.5	- 01	32		
21	14.5	+ 13	03		
21	15.2	+ 15	15		
21	15.4	+ 19	13		
21	16.1	+ 13	37		
21	16.2	+ 22	28		
21	16.4	+ 19	45		
21	17.8	+ 18	04		
21	17.9	+ 02	33		
21	18.8	+ 22	53		
21	19.2	+ 16	38		
21	19.4	+ 12	55		
21	19.5	+ 08	19		
21	21.5	+ 19	02		
21	22.6	+ 20	54		
21	23.8	+ 13	58		
21	25.8	+ 08	33		
21	26.4	+ 11	58		
21	27.2	+ 06	27		

Position 1950				D	S
h	m	o	'		
21	28.1	+ 19	40		
21	29.4	- 02	46		
21	30.0	+ 09	56		
21	30.1	+ 10	44		
21	30.8	+ 11	24		
21	31.1	+ 00	52		
21	31.8	+ 08	27		
21	34.0	+ 12	37		
21	34.2	+ 01	02		
21	37.3	+ 10	07		
21	37.4	+ 05	08		
21	37.6	+ 12	33		
21	41.0	+ 13	52		
21	43.7	+ 16	24		
21	44.3	+ 12	55		
21	44.8	+ 13	23		
21	48.2	+ 02	35		
21	49.4	+ 02	46		
21	49.8	+ 03	12		
21	49.8	+ 30	12		
21	49.9	+ 06	54		
21	51.0	+ 15	18		
21	51.4	+ 00	39		
21	55.8	+ 08	11		
21	56.7	+ 17	56		
21	57.8	+ 18	16		
22	00.0	+ 18	04		
22	01.6	+ 05	57		

Position 1950				D	S
h	m	o	'		
22	02.5	+ 03	57		
22	03.5	+ 20	23		
22	05.5	+ 13	44		
22	06.0	+ 16	33		
22	06.0	+ 18	12		
22	06.2	- 00	55		
22	07.2	+ 17	24		
22	09.2	+ 04	15		
22	09.2	+ 10	38		
22	09.5	+ 18	26		
22	12.3	+ 13	25		
22	12.6	+ 21	12		
22	13.4	+ 18	58		
22	14.7	+ 13	59		
22	16.6	+ 06	04		
22	16.8	+ 11	53		
22	22.0	+ 17	50		
22	29.4	+ 03	35		
22	28.5	+ 00	01		
22	30.6	+ 07	50		
22	33.5	+ 18	50		
22	37.6	- 02	41		
22	38.6	+ 01	30		
22	38.9	+ 23	05		
22	55.3	+ 23	01		
23	01.6	+ 22	21		
23	04.5	+ 22	40		
23	49.0	+ 18	47		

Third List*†

Compact Galaxies and compact parts of Galaxies

by
F. Zwicky
Mount Wilson and Palomar Observatories
Carnegie Institution of Washington
California Institute of Technology

May 1, 1965

D = direct photograph with the 200" telescope has been obtained

S = spectrum with the prime focus spectrograph of the Hale telescope has been obtained

Position 1950				D	S
h	m	o	'		
0	7.8	+ 21	16		
0	8.0	+ 10	42	x	x
0	12.8	+ 24	12		
0	16.7	+ 3	52		
0	19.8	+ 25	15		
0	20.3	+ 25	13		
0	22.2	+ 3	01		
0	23.9	+ 21	29		
0	24.7	- 2	03		
0	36.3	+ 6	46		
0	41.8	+ 16	32		
0	45.3	+ 22	06		
0	46.3	+ 17	47		
0	48.5	+ 0	52		
0	51.4	+ 16	38		
0	52.2	+ 2	32		
0	54.8	+ 9	30		
0	56.4	+ 20	06		

*The first list was presented at the Hamburg IAU Assembly within Commission 28, in August 1964.

†The second list was published March 18, 1965.

Position 1950				D	S
h	m	o	'		
01	0.3	+ 16	09		
01	3.7	+ 19	12		
01	7.9	+ 10	23		
01	8.2	+ 8	03		
01	18.4	+ 22	31		
01	18.5	+ 21	46		
01	18.6	+ 16	46		
01	19.5	+ 16	02		
01	21.4	+ 13	46		
01	23.8	+ 7	56		
01	28.9	+ 18	00		
01	29.0	+ 14	41		
01	32.5	+ 17	27		
01	36.4	+ 21	28		
01	41.2	+ 16	48		
01	41.3	+ 15	00		
01	41.8	+ 16	50		
01	47.6	+ 17	28		
01	52.7	+ 1	14		
01	53.7	+ 5	23		
01	58.0	+ 11	56		
02	0.3	+ 20	46		
02	2.8	+ 18	42		
02	8.9	+ 13	40		
02	11.2	+ 3	53		
02	22.0	+ 29	10		
02	24.5	+ 12	58		
02	24.8	+ 21	57		

Position 1950				D	S
h	m	o	'		
02	26.8	+ 22	02		
02	28.8	+ 22	43		
02	29.7	+ 29	26		
02	34.7	+ 20	56		
02	36.7	+ 12	28		
02	55.0	+ 5	49		
03	18.0	+ 15	46		
03	38.3	+ 15	10		
03	38.7	- 1	27		
03	41.6	+ 10	33		
03	56.6	+ 7	48		
04	2.6	+ 19	19		
08	24.8	+ 21	39		
09	36.5	+ 32	34		
10	25.2	+ 19	45		
11	37.8	+ 43	51		
11	48.5	+ 43	23		
11	58.8	+ 45	56		
12	22.7	+ 15	02		
12	24.7	+ 14	24		
12	40.0	+ 10	10		
12	55.6	+ 27	07		
13	1.2	+ 27	27		
15	7.4	+ 55	48		
15	16.6	+ 28	30		
15	19.0	+ 02	58		
15	25.3	+ 28	30		
15	25.6	+ 28	25		

Position 1950				D	S
h	m	o	'		
15	59.9	+ 16	03		
16	19.7	+ 40	19		
16	22.1	+ 41	12	x	x
16	25.1	+ 40	48	x	
16	27.2	+ 40	58		
16	27.3	+ 40	38		
16	27.3	+ 42	56		
16	27.6	+ 40	59	x	x
16	28.2	+ 40	57		
16	29.1	+ 40	54		
16	29.4	+ 41	01		
16	29.5	+ 40	37		
16	30.4	+ 42	18		
16	36.1	+ 42	37		
21	51.1	+ 3	23		
22	19.7	+ 14	28		
22	58.3	+ 16	31		
23	2.1	- 1	45		
23	4.9	+ 15	36		
23	7.3	+ 8	14		
23	10.3	+ 15	38		
23	12.6	+ 9	24		
23	12.7	- 1	30		
23	13.1	+ 1	22		
23	13.2	- 2	39		
23	14.2	+ 8	37		x
23	14.8	+ 17	46		
23	18.0	+ 16	57	x	x

Position 1950				D	S
h	m	°	'		
23	20.5	+ 6	01		
23	20.6	+ 12	46		
23	21.7	+ 6	08		
23	26.5	+ 24	53		
23	27.7	+ 25	15		
23	30.2	+ 19	05		x
23	30.6	+ 9	29		
23	30.8	+ 12	00		
23	31.7	+ 14	42		
23	36.2	+ 8	47		
23	36.9	+ 8	35		
23	38.1	- 2	53	×	×
23	38.3	+ 9	12		
23	39.3	- 1	36		
23	39.8	+ 6	39		
23	42.8	+ 26	46		
23	45.2	+ 27	24		
23	46.7	+ 17	49		
23	46.9	+ 10	20		
23	49.3	+ 8	32		
23	50.3	+ 27	6		
23	50.9	+ 15	50		
23	59.2	+ 23	13		
23	59.6	+ 2	40		
23	59.9	+ 3	04		

Fourth List*†‡

Compact Galaxies and compact parts of Galaxies

by
F. Zwicky
Mount Wilson and Palomar Observatories
Carnegie Institution of Washington
California Institute of Technology

June 17, 1966

D = direct photograph with the 200" telescope has been obtained

S = spectrum with the prime focus spectrograph of the Hale telescope has been obtained

No.	Position 1950				D	S
	h	m	o	'		
1	00	00.6	+ 21	42		
2	00	00.6	+ 24	54		
3	00	00.8	+ 34	37		
4	00	01.1	+ 24	20		
5	00	01.1	+ 25	41		
6	00	04.7	+ 28	05		
7	00	05.2	+ 35	05		
8	00	05.6	+ 25	07		
9	00	06.7	+ 39	19		
10	00	07.0	+ 27	32		
11	00	15.6	+ 37	57		
12	00	17.3	+ 31	51		
13	00	18.0	+ 31	14		
14	00	18.6	+ 34	05		
15	00	18.9	+ 27	47		
16	00	20.1	+ 33	30		
17	00	20.5	+ 23	55		

*The first list was presented at the Hamburg IAU Assembly within Commission 28, in August 1964.
†The second list was published March 18, 1965.
‡The third list was published May 1, 1965.

No.	Position 1950				D	S
	h	m	o	'		
18	00	21.6	+ 36	19		
19	00	24.1	+ 37	20		
20	00	24.7	+ 39	31		
21	00	25.5	+ 32	53		
22	00	26.5	+ 39	13		
23	00	26.7	+ 30	17		
24	00	27.8	+ 32	27		
25	00	28.4	+ 25	47		
26	00	30.8	+ 30	35		
27	00	36.4	+ 25	17		
28	00	37.3	+ 26	54		
29	00	39.5	+ 40	03	x	
30	00	40.6	+ 39	33		
31	00	41.8	+ 37	27		
32	00	46.9	+ 23	18		
33	00	52.3	+ 38	33		
34	00	53.1	+ 23	52		
35	00	55.7	+ 26	35		
36	00	56.2	+ 27	20		
37	01	00.5	+ 34	12		
38	01	04.6	+ 32	08		
39	01	08.5	+ 32	51		
40	01	08.7	+ 29	51		
41	01	08.9	+ 35	26		
42	01	12.3	+ 33	07		
43	01	13.2	+ 30	43		
44	01	14.5	+ 27	32		
45	01	22.5	+ 33	46		

No.	Position 1950				D	S
	h	m	o	'		
46	01	25.1	+ 24	39		
47	01	26.1	+ 39	09		
48	01	27.7	+ 33	58		
49	01	28.2	+ 30	52		
50	01	28.9	+ 27	02		
51	01	29.2	+ 31	51		
52	01	31.7	+ 37	43		
53	01	32.1	+ 35	47		
54	01	33.9	+ 35	16		
55	01	35.0	+ 23	53		
56	01	36.8	+ 26	54		
57	01	38.8	+ 37	18		
58	01	39.7	+ 38	32		
59	01	40.6	+ 39	13		
60	01	43.9	+ 34	37		
61	04	29.6	+ 00	44		
62	16	27.3	+ 39	23		
63	16	28.1	+ 40	59		
64	20	37.2	+ 27	04		
65	20	44.9	+ 25	15		
66	20	45.4	+ 25	17		
67	21	00.4	+ 36	30		
68	21	08.9	+ 28	42		
69	21	18.1	+ 31	53		
70	21	24.9	+ 37	18		
71	21	29.6	+ 34	18		
72	21	29.8	+ 29	55		
73	21	35.1	+ 27	25		

No.	Position 1950				D	S
	h	m	o	'		
74	21	39.7	+ 25	04		
75	21	42.1	+ 37	18		
76	21	45.2	+ 33	33		
77	21	45.9	+ 26	13		×
78	21	47.8	+ 34	43		
79	21	49.9	+ 23	11		
80	21	50.7	+ 38	43		
81	21	51.8	+ 28	47		
82	21	56.9	+ 25	47		
83	21	59.8	+ 38	11		
84	22	01.7	+ 24	16		
85	22	03.6	+ 23	02		
86	22	12.9	+ 38	04		
87	22	13.2	+ 37	05		
88	22	13.3	+ 30	58		
89	22	13.4	+ 37	46		
90	22	13.5	+ 37	03		
91	22	13.6	+ 24	56		
92	22	13.7	+ 27	14		
93	22	13.8	+ 22	41		
94	22	13.9	+ 25	36		
95	22	14.5	+ 37	14		
96	22	17.2	+ 35	45		
97	22	19.5	+ 36	06		
98	22	20.4	+ 35	57		
99	22	22.6	+ 38	34		
100	22	23.6	+ 29	51		
101	22	25.5	+ 28	39		

No.	Position 1950				D	S
	h	m	°	'		
102	22	25.8	+ 22	11		
103	22	26.7	+ 28	40		
104	22	27.1	+ 35	22		
105	22	28.1	+ 21	53		
106	22	33.5	+ 28	14		
107	22	34.3	+ 39	16		
108	22	37.0	+ 24	13		
109	22	38.9	+ 23	43		
110	22	39.5	+ 35	52		
111	22	40.8	+ 31	24		
112	22	41.5	+ 23	34		
113	22	41.9	+ 34	05		
114	22	42.8	+ 23	12		
115	22	42.8	+ 33	56		
116	22	47.0	+ 30	01		
117	22	47.3	+ 32	05		
118	22	48.6	+ 34	35		
119	22	49.2	+ 33	21		
120	22	49.3	+ 22	54		
121	22	50.2	+ 24	28		
122	22	51.1	+ 31	23		X
123	22	52.0	+ 32	13		
124	22	53.1	+ 24	29		
125	22	54.0	+ 27	27		
126	22	55.8	+ 24	57		
127	22	56.0	+ 35	15		
128	22	57.8	+ 26	32		
129	22	59.1	+ 32	04		

No.	Position 1950				D	S
	h	m	o	'		
130	23	02.7	+ 39	06		
131	23	03.2	+ 24	21		
132	23	05.8	+ 27	32		
133	23	06.1	+ 38	47		
134	23	07.8	+ 29	39		
135	23	09.9	+ 30	51		
136	23	10.0	+ 35	01		
137	23	11.0	+ 22	52		
138	23	11.2	+ 24	41		
139	23	11.9	+ 24	41		
140	23	14.7	+ 28	42		
141	23	16.5	+ 25	47		
142	23	17.6	+ 25	58		
143	23	17.7	+ 27	37		
144	23	18.1	+ 25	05		
145	23	18.7	+ 29	17		
146	23	20.6	+ 28	30		
147	23	21.1	+ 30	33		
148	23	23.8	+ 32	40		
149	23	25.2	+ 23	19		
150	23	25.6	+ 24	33		
151	23	26.1	+ 32	09		
152	23	26.2	+ 14	25		x x
153	23	27.6	+ 25	15		
154	23	28.4	+ 29	41		
155	23	31.0	+ 33	23		
156	23	32.2	+ 34	57		
157	23	34.3	+ 23	46		

No.	Position 1950				D	S
	h	m	o	'		
158	23	35.9	+ 36	08		
159	23	37.2	+ 32	16		
160	23	37.3	+ 34	09		
161	23	37.3	+ 38	54		
162	23	40.6	+ 29	55		
163	23	40.8	+ 28	14		
164	23	44.2	+ 21	48		
165	23	44.6	+ 29	13		
166	23	45.8	+ 32	14		
167	23	49.0	+ 25	16		
168	23	50.4	+ 27	07		
169	23	51.9	+ 26	20		
170	23	52.0	+ 21	32		
171	23	53.3	+ 26	16		
172	23	53.3	+ 36	57		
173	23	53.7	+ 24	43		
174	23	55.8	+ 27	41		
175	23	55.9	+ 27	46		
176	23	56.2	+ 26	39		
177	23	57.8	+ 22	44		

Fifth List*

Compact Galaxies and compact parts of Galaxies

Eruptive Galaxies and Post-eruptive Galaxies

by
F. Zwicky
Mount Wilson and Palomar Observatories
Carnegie Institution of Washington
California Institute of Technology

March 1967

D = direct photograph with the 200" telescope has been obtained

S = spectrum with the prime focus spectrograph of the Hale telescope has been obtained

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No.	Position 1950 h m	o '	D	S	No.	Position 1950 h m	o '	D	S
1.	00 01.3	+ 51 28			17.	00 22.4	+ 39 22		
2.	00 03.4	+ 47 07			18.	00 22.6	+ 39 40		
3.	00 04.8	+ 46 46			19.	00 24.1	+ 49 01		
4.	00 06.9	+ 47 51			20.	00 24.2	+ 48 51		
5.	00 10.0	+ 52 21			21.	00 26.8	+ 51 35		
6.	00 11.1	+ 47 52			22.	00 27.1	+ 39 58		
7.	00 12.4	+ 51 05			23.	00 31.7	+ 42 50		
8.	00 13.5	+ 47 20			24.	00 34.3	+ 50 06		
9.	00 14.9	+ 48 02			25.	00 34.7	+ 45 43		
10.	00 15.3	+ 45 56			26.	00 35.2	+ 45 20		
11.	00 16.4	+ 46 03			27.	00 36.1	+ 40 18		
12.	00 17.2	+ 44 58			28.	00 36.3	+ 45 36		
13.	00 17.3	+ 43 58			29.	00 36.4	+ 40 18		
14.	00 19.1	+ 43 33			30.	00 37.4	+ 48 17		
15.	00 19.3	+ 41 33			31.	00 37.5	+ 53 16		
16.	00 20.3	+ 49 15			32.	00 39.0	+ 40 01		

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*The first list was presented at the Hamburg IAU Assembly to Commission 28, in August 1964.
The second, third and fourth lists were issued respectively on March 18, 1965· May 1, 1965; and June 17, 1966.

No.	Position 1950 h m	o '	D	S
33.	00 39.1	+ 46 23		
34.	00 44.0	+ 46 32		
35.	00 44.6	+ 40 57		
36.	00 46.5	+ 49 45		
37.	00 50.4	+ 50 46		
38.	00 50.7	+ 44 22		
39.	00 51.6	+ 50 21		
40.	00 51.8	+ 42 00		
41.	00 53.1	+ 47 09		
42.	00 54.8	+ 43 32		
43.	00 55.8	+ 51 21		
44.	00 56.0	+ 47 06		
45.	00 59.4	+ 49 39		
46.	00 59.9	+ 43 16		
47.	01 01.2	+ 45 52		
48.	01 01.3	+ 38 36		
49.	01 03.3	+ 42 00		
50.	01 03.8	+ 45 39		
51.	01 05.0	+ 41 43		
52.	01 05.7	+ 39 23		
53.	01 05.9	+ 38 33		
54.	01 08.3	+ 43 46		
55.	01 09.3	+ 41 32		
56.	01 09.5	+ 43 02		
57.	01 10.7	+ 46 06		
58.	01 12.2	+ 50 05		
59.	01 12.6	+ 56 13		
60.	01 14.6	+ 39 44		
61.	01 14.7	+ 43 24		

No.	Position 1950 h m	o '	D	S
62.	01 15.1	+ 55 37		
63.	01 15.2	+ 50 33		
64.	01 17.0	+ 51 29		
65.	01 17.4	+ 40 18		
66.	01 20.1	+ 44 11		
67.	01 20.9	+ 49 43		
68.	01 23.6	+ 48 08		
69.	01 23.7	+ 39 37		
70.	01 24.5	+ 41 48		
71.	01 26.0	+ 40 04		
72.	01 26.2	+ 48 34		
73.	01 26.7	+ 43 50		
74.	01 27.3	+ 44 31		
75.	01 28.5	+ 55 19		
76.	01 29.3	+ 42 19		
77.	01 29.6	+ 41 44		
78.	01 30.0	+ 39 57		
79.	01 30.3	+ 45 42		
80.	01 31.0	+ 42 30		
81.	01 34.0	+ 42 04		
82.	01 34.4	+ 42 36		
83.	01 36.4	+ 32 25		
84.	01 36.5	+ 31 19		
85.	01 37.6	+ 32 00		
86.	01 37.6	+ 43 37		
87.	01 37.7	+ 42 38		
88.	01 37.7	+ 45 35		
89.	01 37.8	+ 42 00		
90.	01 39.3	+ 29 20		

No.	Position 1950 h m	o '	D	S
91.	01 39.4	+ 33 27		
92.	01 39.5	+ 49 48		
93.	01 40.0	+ 25 22		
94.	01 40.0	+ 42 02		
95.	01 40.6	+ 53 01		
96.	01 40.7	+ 28 42		
97.	01 41.1	+ 28 40		
98.	01 41.7	+ 37 27		
99.	01 41.9	+ 23 53		
100.	01 42.2	+ 30 40		
101.	01 42.5	+ 38 28		
102.	01 43.3	+ 23 12		
103.	01 43.3	+ 28 32		
104.	01 43.7	+ 28 57		
105.	01 44.0	+ 34 38		
106.	01 44.1	+ 34 32		
107.	01 44.5	+ 35 55		
108.	01 45.1	+ 23 11		
109.	01 45.1	+ 53 03		
110.	01 45.8	+ 32 43		
111.	01 45.8	+ 43 38		
112.	01 46.1	+ 32 52		
113.	01 46.5	+ 34 44		
114.	01 46.8	+ 35 32		
115.	01 47.1	+ 34 07		
116.	01 47.3	+ 36 00		
117.	01 47.4	+ 33 34		
118.	01 47.4	+ 35 44		
119.	01 47.6	+ 46 38		
120.	01 47.8	+ 33 30		
121.	01 48.1	+ 28 11		
122.	01 48.2	+ 21 45		
123.	01 48.5	+ 22 20		
124.	01 48.5	+ 37 52		
125.	01 48.6	+ 33 15		
126.	01 48.6	+ 35 48		
127.	01 48.7	+ 32 32		
128.	01 48.7	+ 33 16		
129.	01 48.8	+ 33 17		
130.	01 49.2	+ 31 40		
131.	01 49.2	+ 35 10		
132.	01 49.2	+ 39 08		
133.	01 49.3	+ 35 51		
134.	01 49.7	+ 35 53		
135.	01 49.8	+ 53 58		
136.	01 51.1	+ 40 02		
137.	01 51.3	+ 34 04		
138.	01 52.1	+ 34 35		
139.	01 52.2	+ 33 39		
140.	01 52.3	+ 29 55		
141.	01 52.4	+ 37 03		
142.	01 52.9	+ 34 23		
143.	01 53.3	+ 34 46		
144.	01 53.4	+ 35 20		
145.	01 53.5	+ 33 17		
146.	01 53.7	+ 33 56		
147.	01 54.3	+ 31 46		
148.	01 54.3	+ 54 43		

No.	Position 1950 h m	o '	D	S
149.	01 54.4	+ 28 20		
150.	01 54.4	+ 31 45		
151.	01 54.5	+ 29 13		
152.	01 54.6	+ 28 44		
153.	01 54.6	+ 57 11		
154.	01 54.8	+ 31 13		
155.	01 54.9	+ 27 37		
156.	01 55.0	+ 35 39		
157.	01 55.1	+ 37 20		
158.	01 55.6	+ 36 32		
159.	01 55.7	+ 37 28		
160.	01 56.3	+ 36 36		
161.	01 56.9	+ 39 17		
162.	01 57.2	+ 23 31		
163.	01 57.6	+ 46 33		
164.	01 57.7	+ 27 59		
165.	01 58.4	+ 29 57		
166.	01 58.5	+ 28 30		
167.	01 59.1	+ 23 17		
168.	01 59.7	+ 23 24		
169.	02 00.1	+ 30 01		
170.	02 00.4	+ 37 52		
171.	02 01.0	+ 25 41		
172.	02 01.0	+ 47 44		
173.	02 01.2	+ 23 58		
174.	02 01.2	+ 34 55		
175.	02 01.2	+ 45 31		
176.	02 01.9	+ 39 27		
177.	02 02.1	+ 33 10		
178.	02 02.2	+ 51 46		
179.	02 02.5	+ 37 22		
180.	02 02.6	+ 51 47		
181.	02 02.9	+ 27 10		
182.	02 03.3	+ 29 29		
183.	02 03.3	+ 32 43		
184.	02 03.6	+ 38 16		
185.	02 03.7	+ 32 45		
186.	02 03.7	+ 33 01		
187.	02 04.5	+ 24 15		
188.	02 04.9	+ 34 53		
189.	02 05.0	+ 34 57		
190.	02 05.5	+ 35 55		
191.	02 06.6	+ 35 33		
192.	02 06.8	+ 54 27		
193.	02 07.7	+ 34 58		
194.	02 08.2	+ 37 15		
195.	02 08.2	+ 50 06		
196.	02 08.6	+ 38 05		
197.	02 08.6	+ 53 08		
198.	02 08.9	+ 30 23		
199.	02 09.0	+ 30 17		
200.	02 09.2	+ 30 51		
201.	02 10.8	+ 39 24		
202.	02 11.0	+ 31 38		
203.	02 12.1	+ 35 43		
204.	02 12.2	+ 30 31		

No.	Position 1950 h m	o '	D	S
205.	02 12.3	+ 35 02		
206.	02 13.3	+ 25 00		
207.	02 13.3	+ 36 04		
208.	02 14.1	+ 27 22		
209.	02 14.3	+ 27 30		
210.	02 14.3	+ 27 37		
211.	02 14.3	+ 36 29		
212.	02 14.6	+ 29 18		
213.	02 14.9	+ 34 17		
214.	02 15.0	+ 22 01		
215.	02 16.1	+ 34 17		
216.	02 16.3	+ 34 46		
217.	02 16.4	+ 36 21		
218.	02 16.6	+ 29 33		
219.	02 17.2	+ 29 48		
220.	02 17.6	+ 28 56		
221.	02 17.8	+ 28 01		
222.	02 17.9	+ 34 40		
223.	02 18.4	+ 39 09		
224.	02 18.7	+ 44 08		
225.	02 19.1	+ 37 03		
226.	02 19.3	+ 36 15		
227.	02 19.3	+ 47 37		
228.	02 19.4	+ 43 42		
229.	02 20.0	+ 41 08		
230.	02 20.0	+ 42 45		
231.	02 20.1	+ 36 08		
232.	02 20.3	+ 45 35		
233.	02 20.4	+ 31 58		
234.	02 21.8	+ 41 18		
235.	02 22.1	+ 26 08		
236.	02 22.1	+ 45 26		
237.	02 22.6	+ 41 39		
238.	02 22.8	+ 24 35		
239.	02 23.1	+ 36 34		
240.	02 23.2	+ 37 00		
241.	02 24.0	+ 27 58		
242.	02 24.5	+ 22 52		
243.	02 24.6	+ 21 46		
244.	02 24.8	+ 26 22		
245.	02 24.9	+ 22 36		
246.	02 24.9	+ 37 13		
247.	02 25.8	+ 22 48		
248.	02 26.4	+ 27 47		
249.	02 28.0	+ 22 15		
250.	02 28.0	+ 41 45		
251.	02 29.0	+ 32 29		
252.	02 29.2	+ 37 18		
253.	02 29.3	+ 25 08		
254.	02 30.8	+ 33 23		
255.	02 31.0	+ 31 45		
256.	02 31.6	+ 29 45		
257.	02 31.9	+ 23 11		
258.	02 32.5	+ 31 25		
259.	02 32.5	+ 32 07		
260.	02 33.3	+ 33 22		
261.	02 33.4	+ 31 30		
262.	02 33.5	+ 45 10		

No.	Position 1950		D	S
	h m	o '		
263.	02 33.7	+ 31 14		
264.	02 36.2	+ 45 48		
265.	02 36.3	+ 42 19		
266.	02 36.5	+ 35 52		
267.	02 37.0	+ 35 57		
268.	02 37.6	+ 35 06		
269.	02 37.7	+ 32 30		
270.	02 37.8	+ 38 29		
271.	02 38.0	+ 45 38		
272.	02 39.1	+ 29 56		
273.	02 39.9	+ 34 53		
274.	02 40.0	+ 32 06		
275.	02 41.0	+ 37 18		
276.	02 42.3	+ 41 21		
277.	02 43.3	+ 35 14		
278.	02 44.5	+ 21 42		
279.	02 46.3	+ 35 12		
280.	02 46.4	+ 46 46		
281.	02 47.1	+ 38 59		
282.	02 48.7	+ 27 00		
283.	02 48.8	+ 47 24		
284.	02 49.2	+ 36 32		
285.	02 49.2	+ 46 46		
286.	02 51.2	+ 41 22		
287.	02 51.9	+ 36 01		
288.	02 52.3	+ 45 30		
289.	02 52.5	+ 35 53		
290.	02 52.7	+ 30 55		
291.	02 52.7	+ 41 21		

No.	Position 1950		D	S
	h m	o '		
292.	02 53.2	+ 35 20		
293.	02 53.4	+ 26 14		
294.	02 55.1	+ 31 25		
295.	02 55.5	+ 34 45		
296.	02 55.6	+ 35 50		
297.	02 55.7	+ 41 06		
298.	02 55.8	+ 25 12		
299.	02 55.8	+ 46 18		
300.	02 56.1	+ 39 28		
301.	02 56.2	+ 44 08		
302.	02 56.4	+ 31 11		
303.	02 56.6	+ 32 36		
304.	02 56.6	+ 35 28		
305.	02 56.7	+ 41 21		
306.	02 56.8	+ 26 14		
307.	02 57.0	+ 39 18		
308.	02 57.4	+ 34 59		
309.	02 57.6	+ 44 09		
310.	02 58.6	+ 44 04		
311.	02 58.7	+ 35 39		
312.	02 59.2	+ 28 57		
313.	03 00.2	+ 27 22		
314.	03 00.6	+ 27 15		
315.	03 00.7	+ 30 25		
316.	03 00.9	+ 47 19		
317.	03 01.0	+ 31 11		
318.	03 01.1	+ 45 19		
319.	03 02.9	+ 42 11		
320.	03 03.4	+ 47 17		

No.	Position 1950 h	m	o	'	D	S
321.	03	04.7	+ 29	25		
322.	03	05.8	+ 34	21		
323.	03	06.6	+ 41	22		
324.	03	07.8	+ 47	09		
325.	03	08.0	+ 22	16		
326.	03	09.7	+ 36	05		
327.	03	09.9	+ 34	02		
328.	03	09.9	+ 34	48		
329.	03	10.3	+ 30	03		
330.	03	10.6	+ 41	04		
331.	03	10.7	+ 41	05		
332.	03	11.2	+ 42	58		
333.	03	11.6	+ 25	24		
334.	03	11.8	+ 49	05		
335.	03	12.2	+ 30	45		
336.	03	14.5	+ 23	29		
337.	03	16.1	+ 27	07		
338.	03	16.7	+ 41	20		
339.	03	16.7	+ 41	23		
340.	03	18.3	+ 32	30		
341.	03	20.0	+ 24	41		
342.	03	20.1	+ 32	40		
343.	03	20.6	+ 42	07		
344.	03	22.0	+ 41	44		
345.	03	23.9	+ 22	53		
346.	03	24.9	+ 21	10		
347.	03	25.0	+ 43	00		
348.	03	26.3	+ 40	42		

No.	Position 1950 h	m	o	'	D	S
349.	03	27.4	+ 24	29		
350.	03	27.4	+ 32	38		
351.	03	27.8	+ 46	50		
352.	03	29.1	+ 24	41		
353.	03	30.9	+ 40	45		
354.	03	31.6	+ 28	34		
355.	03	33.3	+ 34	03		
356.	03	34.1	+ 47	15		
357.	03	36.3	+ 28	00		
358.	03	36.8	+ 23	58		
359.	03	36.8	+ 38	30		
360.	03	36.8	+ 42	17		
361.	03	39.2	+ 26	25		
362.	03	39.4	+ 25	55		
363.	03	48.1	+ 37	30		
364.	03	50.2	+ 35	45		
365.	03	53.6	+ 27	13		
366.	03	59.1	+ 46	29		
367.	04	00.5	+ 32	00		
368.	04	00.6	+ 23	51		
369.	04	02.2	+ 51	18		
370.	04	06.3	+ 44	13		
371.	04	07.4	+ 29	41		
372.	04	10.8	+ 29	02		
373.	04	16.0	+ 26	43		
374.	04	28.8	+ 44	17		
375.	04	34.3	+ 24	56		
376.	05	02.3	+ 23	57		

No.	Position 1950 h m	o '	D	S
377.	05 04.8	+ 44 16		
378.	21 48.7	+ 41 45		
379.	21 57.3	+ 44 05		
380.	22 01.5	+ 43 30		
381.	22 13.4	+ 39 43		
382.	22 14.2	+ 50 25		
383.	22 15.1	+ 48 23		
384.	22 17.1	+ 44 59		
385.	22 25.0	+ 51 15		
386.	22 27.5	+ 50 36		
387.	22 33.7	+ 40 20		
388.	22 34.6	+ 47 10		
389.	22 40.1	+ 40 35		
390.	22 40.3	+ 40 28		
391.	22 40.4	+ 39 27		
392.	22 45.2	+ 40 58		
393.	22 55.2	+ 45 25		
394.	23 00.7	+ 44 25		
395.	23 02.0	+ 46 16		
396.	23 05.0	+ 41 56		
397.	23 05.1	+ 43 20		
398.	23 06.1	+ 46 38		
399.	23 08.3	+ 40 17		
400.	23 17.6	+ 40 54		
401.	23 21.3	+ 44 35		
402.	23 21.4	+ 42 52		
403.	23 24.3	+ 47 02		
404.	23 24.8	+ 47 34		

No.	Position 1950 h m	o '	D	S
405.	23 25.8	+ 44 55		
406.	23 26.4	+ 43 36		
407.	23 28.1	+ 54 50		
408.	23 28.4	+ 44 01		
409.	23 29.6	+ 44 26		
410.	23 29.9	+ 44 42		
411.	23 30.2	+ 47 09		
412.	23 30.3	+ 48 40		
413.	23 31.5	+ 47 25		
414.	23 32.2	+ 47 13		
415.	23 33.0	+ 45 30		
416.	23 33.3	+ 42 06		
417.	23 34.7	+ 52 53		
418.	23 34.8	+ 49 17		
419.	23 35.1	+ 43 51		
420.	23 36.1	+ 45 12		
421.	23 38.3	+ 47 25		
422.	23 38.9	+ 47 31		
423.	23 39.5	+ 53 38		
424.	23 41.1	+ 44 43		
425.	23 41.7	+ 42 38		
426.	23 43.0	+ 43 17		
427.	23 44.8	+ 48 03		
428.	23 45.0	+ 54 45		
429.	23 45.3	+ 51 00		
430.	23 47.0	+ 40 53		
431.	23 48.7	+ 39 46		
432.	23 49.9	+ 39 38		

No.	Position 1950		D	S
	h m	o '		
433.	23 50.0	+ 47 06		
434.	23 50.0	+ 50 03		
435.	23 50.3	+ 47 12		
436.	23 50.9	+ 46 31		
437.	23 51.5	+ 47 13		
438.	23 51.9	+ 40 53		
439.	23 52.7	+ 43 39		
440.	23 53.6	+ 49 13		
441.	23 54.1	+ 46 38		
442.	23 54.4	+ 47 41		
443.	23 54.9	+ 47 36		
444.	23 55.9	+ 49 10		
445.	23 56.5	+ 48 05		
446.	23 56.6	+ 51 40		

Sixth List*

(222 objects)

Compact Galaxies and compact parts of Galaxies

Eruptive Galaxies and Post-eruptive Galaxies

by

May 1968

F. Zwicky
Mount Wilson and Palomar Observatories
Carnegie Institution of Washington
California Institute of Technology

D = direct photograph with the 200" telescope has been obtained.

S = spectrum with the prime focus spectrograph of the Hale telescope has been obtained.

No.	Position 1950		D	S
	h m	o '		
1	00 39.2	+40 07		
2	01 34.4	+30 28		
3	01 34.7	+33 28		
4	01 34.8	+32 24		
5	01 35.7	+30 31		
6	01 36.6	+29 19		
7	01 38.0	+31 17		
8	01 38.2	+28 00		
9	01 38.2	+32 38		
10	01 38.3	+28 03		
11	01 38.4	+27 29		
12	01 39.4	+32 03		
13	01 39.6	+30 04		
14	01 39.9	+31 52		
15	01 41.3	+27 40		

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*The first list was presented at the Hamburg IAU Assembly to Commission 28, in August 1964.
The second, third, fourth and fifth lists were issued respectively on March 18, 1965; May 1, 1965; June 17, 1966; and March 1967.

No.	Position 1950		D	S
	h m	o '		
16	01 41.3	+33 24		
17	01 41.5	+29 50		
18	01 41.6	+38 22		
19	01 41.9	+28 39		
20	01 42.0	+28 45		
21	01 42.5	+34 45		
22	01 42.9	+37 54		
23	01 43.0	+37 53		
24	01 43.2	+37 28		
25	01 43.2	+39 17		
26	01 43.3	+34 08		
27	01 44.2	+29 05		
28	01 44.3	+28 30		
29	01 44.3	+28 56		
30	01 44.3	+33 46		
31	01 44.4	+29 07		
32	01 44.4	+32 55		
33	01 44.5	+28 58		
34	01 44.5	+31 52		
35	01 44.7	+37 23		
36	01 44.9	+35 40		
37	01 44.9	+37 06		
38	01 45.0	+33 07		
39	01 45.0	+33 22		
40	01 45.0	+37 04		
41	01 45.4	+32 22		

No.	Position 1950		D	S
	h m	o '		
42	01 45.4	+32 37		
43	01 45.5	+32 27		
44	01 45.6	+34 56		
45	01 45.7	+32 27		
46	01 45.9	+34 39		
47	01 45.9	+36 20		
48	01 46.1	+36 55		
49	01 46.4	+34 21		
50	01 46.5	+36 10		
51	01 46.7	+32 20		
52	01 47.1	+35 51		
53	01 47.3	+29 30		
54	01 47.3	+35 48		
55	01 47.3	+37 07		
56	01 47.4	+35 16		
57	01 47.4	+36 57		
58	01 47.7	+32 47		
59	01 47.8	+32 51		
60	01 47.8	+36 05		
61	01 47.8	+37 08		
62	01 47.9	+32 52		
63	01 48.0	+32 51		
64	01 48.1	+32 43		
65	01 48.2	+32 48		
66	01 48.3	+32 49		
67	01 48.3	+36 01		

No.	Position 1950		D	S
	h m	o '		
68	01 48.4	+32 56		
69	01 48.4	+36 02		
70	01 48.4	+36 35		
71	01 48.7	+30 27		
72	01 48.8	+33 02		
73	01 48.9	+32 58		
74	01 48.9	+34 48		
75	01 48.9	+36 39		
76	01 49.0	+36 30		
77	01 49.2	+32 44		
78	01 49.2	+34 39		
79	01 49.3	+32 45		
80	01 49.3	+32 46		
81	01 49.3	+37 59		
82	01 49.4	+36 50		
83	01 49.4	+37 57		
84	01 49.5	+32 57		
85	01 49.5	+32 58		
86	01 49.6	+32 30		
87	01 49.6	+32 55		
88	01 49.6	+35 52		
89	01 49.7	+32 54		
90	01 49.7	+35 54		
91	01 49.9	+34 42		
92	01 50.4	+33 08		
93	01 50.4	+36 43		

No.	Position 1950		D	S
	h m	o '		
94	01 50.6	+33 09		
95	01 50.7	+36 04		
96	01 51.0	+37 27		
97	01 51.1	+33 17		
98	01 51.1	+37 34		
99	01 51.2	+31 38		
100	01 51.2	+33 55		
101	01 51.6	+34 35		
102	01 52.1	+28 18		
103	01 52.2	+27 58		
104	01 52.6	+32 24		
105	01 52.8	+27 29		
106	01 53.2	+35 56		
107	01 53.2	+36 04		
108	01 53.4	+36 02		
109	01 53.4	+36 14		
110	01 53.7	+31 10		
111	01 53.7	+32 48		
112	01 53.8	+31 12		
113	01 53.8	+32 49		
114	01 53.8	+33 56		
115	01 54.0	+32 45		
116	01 54.2	+33 00		
117	01 54.3	+32 18		
118	01 54.4	+28 23		
119	01 54.4	+29 35		

No.	Position 1950		D	S
	h m	o '		
120	01 54.4	+ 32 12		
121	01 54.4	+ 32 26		
122	01 54.5	+ 28 21		
123	01 54.5	+ 32 58		
124	01 54.9	+ 30 33		
125	01 55.0	+ 27 38		
126	01 55.1	+ 36 03		
127	01 56.2	+ 32 20		
128	01 56.4	+ 36 02		
129	01 57.1	+ 30 34		
130	01 57.2	+ 30 38		
131	01 57.3	+ 30 38		
132	01 57.3	+ 34 23		
133	01 57.4	+ 30 35		
134	01 57.6	+ 29 46		
135	01 57.7	+ 33 54		
136	01 57.8	+ 36 30		
137	01 58.3	+ 34 27		
138	01 58.7	+ 29 20		
139	01 58.7	+ 30 35		
140	01 58.7	+ 33 32		
141	01 58.8	+ 32 43		
142	01 58.9	+ 37 16		
143	01 59.0	+ 36 00		
144	01 59.2	+ 34 25		
145	01 59.5	+ 39 28		

No.	Position 1950		D	S
	h m	o '		
146	01 59.6	+34 05		
147	01 59.8	+29 46		
148	01 59.9	+35 07		
149	02 00.0	+38 34		
150	02 00.1	+31 44		
151	02 00.1	+34 32		
152	02 00.2	+31 44		
153	02 00.2	+30 18		
154	02 00.6	+37 34		
155	02 00.8	+35 34		
156	02 00.8	+39 02		
157	02 00.9	+31 03		
158	02 01.1	+34 48		
159	02 01.2	+36 22		
160	02 01.6	+36 59		
161	02 01.7	+34 53		
162	02 01.8	+33 34		
163	02 02.5	+37 22		
164	02 02.9	+33 18		
165	02 03.0	+31 57		
166	02 03.2	+39 06		
167	02 04.2	+38 54		
168	02 04.2	+39 13		
169	02 04.3	+36 52		
170	02 04.6	+35 12		
171	02 04.8	+38 17		

No.	Position 1950		D	S
	h m	o '		
172	02 05.5	+37 25		
173	02 05.7	+33 17		
174	02 06.3	+38 32		
175	02 06.4	+35 25		
176	02 06.7	+35 40		
177	02 07.1	+38 57		
178	02 07.2	+34 46		
179	02 07.3	+34 26		
180	02 08.0	+33 58		
181	02 08.1	+34 51		
182	02 09.1	+35 28		
183	02 09.1	+39 00		
184	02 09.6	+34 59		
185	02 09.7	+39 01		
186	02 10.0	+36 12		
187	02 10.4	+35 56		
188	02 10.4	+38 12		
189	02 10.5	+38 13		
190	02 10.6	+36 43		
191	02 10.7	+36 44		
192	02 11.3	+36 18		
193	02 11.4	+36 20		
194	02 11.7	+36 58		
195	02 11.7	+38 42		
196	02 12.2	+33 33		
197	02 12.5	+38 30		

No.	Position 1950		D	S
	h m	o '		
198	02 12.7	+35 18		
199	02 13.0	+35 50		
200	02 15.7	+38 25		
201	02 16.4	+33 58		
202	02 16.5	+34 53		
203	02 17.1	+33 45		
204	02 19.9	+36 59		
205	02 20.7	+34 14		
206	02 21.8	+34 51		
207	02 22.8	+38 17		
208	02 23.2	+36 46		
209	02 23.4	+36 49		
210	02 23.8	+36 30		
211	02 23.9	+34 18		
212	02 24.3	+36 28		
213	02 24.7	+33 51		
214	02 30.2	+39 28		
215	02 33.4	+33 48		
216	02 33.6	+34 42		
217	02 35.5	+37 22		
218	02 38.4	+37 01		
219	02 38.9	+34 49		
220	02 39.1	+35 31		
221	02 39.9	+37 36		
222	02 40.0	+37 36		

Seventh List*

(941 objects)

Compact Galaxies and compact parts of Galaxies

Eruptive Galaxies and Post-eruptive Galaxies

by

F. Zwicky
Mount Wilson and Palomar Observatories
Carnegie Institution of Washington
California Institute of Technology

June, 1968

D = direct photograph with the 200" telescope has been obtained.

S = spectrum with the prime focus spectrograph of the Hale telescope has been obtained.

No.	Position 1950		D	S
	h m	o '		
1	00 46.0	+85 07		
2	01 32.0	+84 22		
3	01 40.0	+85 01		
4	02 27.0	+84 38		
5	03 11.8	+76 48		
6	03 25.0	+84 12		
7	03 25.9	+79 25		
8	03 32.4	+72 24		
9	03 55.2	+66 58		
10	03 55.4	+78 08		
11	04 12.9	+75 27		
12	04 17.0	+75 12		
13	04 21.0	+82 09		
14	04 23.4	+69 29		
15	04 25.8	+73 10		

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* The first list was presented at the Hamburg IAU Assembly to Commission 28, in August 1964.
The second, third, fourth, fifth and sixth lists were issued respectively on March 18, 1965; May 1, 1965; June 17, 1966; March, 1967; and May, 1967.

No.	Position 1950		D	S
	h m	o '		
16	04 26.1	+64 45		
17	04 27.4	+66 13		
18	04 29.0	+73 09		
19	04 35.7	+67 38		
20	04 49.2	+68 18		
21	04 53.3	+69 02		
22	04 54.2	+72 15		
23	04 58.6	+65 44		
24	04 59.2	+69 02		
25	05 01.7	+64 03		
26	05 04.1	+69 08		
27	05 04.6	+66 38		
28	05 06.8	+68 32		
29	05 07.0	+69 46		
30	05 07.4	+65 08		
31	05 08.2	+79 36		
32	05 09.1	+67 13		
33	05 14.7	+63 29		
34	05 15.0	+82 46		
35	05 15.7	+66 12		
36	05 18.8	+63 02		
37	05 19.3	+60 35		
38	05 23.2	+64 13		
39	05 25.0	+63 50		
40	05 26.4	+67 34		
41	05 27.4	+63 48		

No.	Position 1950		D	S
	h m	o '		
42	05 33.5	+63 18		
43	05 37.5	+64 03		
44	05 38.4	+62 20		
45	05 40.0	+69 02		
46	05 42.0	+87 15		
47	05 43.9	+64 47		
48	05 44.5	+68 47		
49	05 45.0	+58 33		
50	05 45.0	+58 40		
51	05 51.6	+63 13		
52	05 52.0	+84 25		
53	05 53.0	+63 49		
54	05 54.0	+82 47		
55	05 55.2	+77 28		
56	05 55.7	+62 58		
57	05 58.0	+62 04		
58	06 02.0	+76 17		
59	06 02.8	+76 41		
60	06 03.0	+67 32		
61	06 07.4	+64 17		
62	06 07.7	+64 34		
63	06 08.1	+61 33		
64	06 09.0	+62 49		
65	06 10.4	+65 39		
66	06 13.8	+60 01		
67	06 16.5	+63 06		

No.	Position 1950	
	h m	o '
68	06 17.1	+ 59 08
69	06 18.0	+ 81 03
70	06 19.2	+ 57 14
71	06 24.2	+ 68 45
72	06 24.8	+ 69 33
73	06 25.7	+ 63 43
74	06 26.1	+ 59 05
75	06 29.3	+ 63 54
76	06 29.7	+ 57 43
77	06 32.5	+ 69 53
78	06 34.0	+ 68 56
79	06 34.0	+ 69 55
80	06 34.2	+ 63 33
81	06 35.0	+ 85 06
82	06 36.2	+ 63 15
83	06 36.2	+ 63 49
84	06 36.6	+ 64 57
85	06 37.1	+ 63 17
86	06 37.7	+ 67 55
87	06 37.8	+ 65 34
88	06 39.2	+ 64 17
89	06 39.8	+ 63 19
90	06 40.6	+ 60 28
91	06 40.6	+ 64 17
92	06 41.0	+ 84 58
93	06 41.5	+ 57 57

No.	Position 1950		D	S
	h m	o '		
94	06 41.6	+66 33		
95	06 42.0	+67 00		
96	06 43.5	+64 03		
97	06 44.0	+67 09		
98	06 44.1	+66 57		
99	06 44.1	+67 17		
100	06 44.2	+63 22		
101	06 44.6	+73 02		
102	06 45.0	+67 15		
103	06 45.6	+67 30		
104	06 47.0	+86 09		
105	06 47.4	+63 10		
106	06 49.5	+65 23		
107	06 49.8	+66 33		
108	06 50.2	+63 26		
109	06 51.2	+67 10		
110	06 51.4	+68 22		
111	06 52.7	+67 21		
112	06 54.6	+68 43		
113	06 56.8	+67 25		
114	06 57.2	+67 39		
115	06 58.7	+64 55		
116	06 59.7	+63 23		
117	07 02.2	+63 00		
118	07 02.3	+64 42		
119	07 02.7	+64 11		

No.	Position 1950		D	S
	h m	o '		
120	07 03.0	+78 08		
121	07 05.2	+59 37		
122	07 05.6	+64 12		
123	07 06.1	+64 18		
124	07 06.4	+64 09		
125	07 06.6	+63 21		
126	07 07.2	+67 09		
127	07 07.3	+67 17		
128	07 08.5	+65 23		
129	07 08.6	+67 16		
130	07 08.7	+67 08		
131	07 09.4	+64 04		
132	07 09.4	+64 13		
133	07 09.8	+65 08		
134	07 11.0	+85 52		
136	07 11.6	+60 10		
137	07 13.7	+68 02		
138	07 14.1	+68 24		
139	07 14.4	+59 47		
140	07 15.2	+59 28		
141	07 15.6	+63 29		
142	07 15.9	+64 27		
143	07 16.0	+82 02		
144	07 16.0	+64 44		
145	07 16.0	+67 30		

No.	Position 1950		D	S
	h m	o '		
146	07 17.1	+66 42		
147	07 17.2	+68 37		
148	07 18.8	+58 13		
149	07 19.0	+68 35		
150	07 20.1	+67 03		
151	07 20.6	+63 37		
152	07 21.4	+64 40		
153	07 22.2	+72 40		
154	07 22.4	+60 19		
155	07 23.5	+69 36		
156	07 23.5	+72 13		
157	07 24.0	+64 03		
158	07 25.3	+68 10		
159	07 25.4	+57 15		
160	07 27.0	+73 29		
161	07 27.4	+64 13		
162	07 28.6	+60 59		
163	07 28.6	+63 22		
164	07 29.8	+68 22		
165	07 31.4	+67 51		
166	07 32.1	+65 04		
167	07 32.6	+67 50		
168	07 32.7	+66 50		
169	07 33.4	+64 20		
170	07 33.4	+75 33		
171	07 34.0	+59 07		

No.	Position 1950		D	S
	h m	o '		
172	07 34.0	+63 53		
173	07 35.1	+73 14		
174	07 35.2	+69 55		
175	07 35.5	+69 59		
176	07 36.5	+67 48		
177	07 37.8	+67 13		
178	07 38.2	+60 39		
179	07 38.9	+73 16		
180	07 39.5	+62 11		
181	07 45.1	+57 11		
182	07 45.5	+65 40		
183	07 45.9	+65 34		
184	07 48.1	+66 13		
185	07 48.8	+63 28		
186	07 49.4	+60 48		
187	07 49.4	+72 24		
188	07 49.5	+59 34		
189	07 50.2	+59 30		
190	07 50.3	+71 16		
191	07 51.4	+66 00		
192	07 51.7	+70 59		
193	07 52.4	+63 49		
194	07 54.0	+58 39		
195	07 54.7	+59 07		
196	07 54.8	+57 38		
197	07 55.3	+56 44		

No.	Position 1950		D	S
	h m	o '		
198	07 55.4	+ 68 26		
199	07 55.5	+ 56 40		
200	07 55.6	+ 60 46		
201	07 56.0	+ 59 30		
202	07 56.5	+ 59 16		
203	07 57.6	+ 68 04		
204	07 58.3	+ 60 24		
205	07 58.6	+ 68 02		
206	07 58.8	+ 57 08		
207	07 59.1	+ 65 29		
208	07 59.7	+ 66 39		
209	08 01.6	+ 62 44		
210	08 02.5	+ 62 36		
211	08 03.7	+ 64 32		
212	08 04.7	+ 57 55		
213	08 04.7	+ 68 14		
214	08 04.9	+ 61 31		
215	08 05.3	+ 57 59		
216	08 08.0	+ 79 00		
217	08 08.2	+ 58 43		
218	08 08.2	+ 71 34		
219	08 08.5	+ 66 31		
220	08 10.7	+ 58 06		
221	08 10.7	+ 58 25		
222	08 13.1	+ 57 10		
223	08 14.1	+ 70 53		

No.	Position 1950		D	S
	h m	o '		
224	08 14.9	+ 58 25		
225	08 15.4	+ 67 35		
226	08 16.2	+ 56 54		
227	08 16.5	+ 56 55		
228	08 16.8	+ 60 19		
229	08 19.0	+ 64 06		
230	08 23.9	+ 71 13		
231	08 24.5	+ 63 52		
232	08 25.6	+ 69 13		
233	08 26.8	+ 68 45		
234	08 27.3	+ 63 01		
235	08 27.4	+ 65 28		
236	08 28.1	+ 70 57		
237	08 29.5	+ 62 30		
238	08 29.6	+ 66 21		
239	08 30.2	+ 57 44		
240	08 30.5	+ 70 47		
241	08 37.2	+ 61 23		
242	08 37.3	+ 61 24		
243	08 38.0	+ 62 30		
244	08 38.6	+ 77 05		
245	08 38.8	+ 70 13		
246	08 39.5	+ 69 02		
247	08 39.9	+ 69 17		
248	08 40.0	+ 71 07		
249	08 40.2	+ 63 53		

	Position 1950		D	S
	h m	o '		
250	08 41.5	+60 22		
251	08 42.0	+78 43		
252	08 42.4	+60 59		
253	08 46.9	+65 45		
254	08 50.0	+57 22		
255	08 51.6	+59 43		
256	08 52.0	+82 53		
257	08 52.3	+67 04		
258	08 56.1	+66 48		
259	08 57.0	+62 50		
260	09 04.8	+77 23		
261	09 05.7	+64 37		
262	09 06.4	+60 29		
263	09 07.5	+64 33		
264	09 07.5	+68 00		
265	09 08.5	+69 22		
266	09 08.9	+70 49		
267	09 09.2	+60 16		
268	09 09.8	+77 13		
269	09 10.0	+66 23		
270	09 10.7	+68 34		
271	09 11.4	+58 25		
272	09 14.5	+58 12		
273	09 15.6	+59 14		
274	09 16.5	+70 57		
275	09 17.0	+74 39		

No.	Position 1950		D	S
	h m	o '		
276	09 17.4	+64 27		
277	09 18.7	+76 45		
278	09 20.4	+73 29		
279	09 22.6	+80 33		
280	09 23.6	+68 40		
281	09 28.8	+61 41		
282	09 29.5	+66 25		
283	09 29.8	+75 13		
284	09 31.4	+65 37		
285	09 32.9	+59 36		
286	09 36.0	+71 27		
287	09 36.8	+69 12		
288	09 38.5	+64 38		
289	09 39.7	+77 41		
290	09 40.7	+78 18		
291	09 42.4	+69 39		
292	09 45.1	+73 28		
293	09 46.1	+67 24		
294	09 46.6	+77 29		
295	09 47.0	+59 04		
296	09 48.0	+58 17		
297	09 49.1	+67 23		
298	09 49.3	+63 05		
299	09 51.1	+67 56		
300	09 53.0	+82 07		
301	09 53.4	+60 12		
302	09 54.4	+65 58		

No.	Position 1950		D	S
	h m	o '		
303	09 57.7	+72 25		
304	09 59.0	+63 30		
305	09 59.2	+62 08		
306	09 59.7	+65 20		
307	10 00.0	+77 53		
308	10 00.3	+59 41		
309	10 01.5	+76 13		
310	10 03.0	+69 48		
311	10 05.7	+61 15		
312	10 09.7	+74 36		
313	10 10.8	+68 02		
314	10 11.2	+58 27		
315	10 11.5	+58 28		
316	10 12.0	+60 23		
317	10 14.7	+66 54		
318	10 14.9	+73 24		
319	10 16.0	+78 58		
320	10 16.3	+77 20		
321	10 16.4	+61 56		
322	10 18.8	+69 56		
323	10 19.8	+78 55		
324	10 21.6	+68 08		
325	10 21.8	+72 07		
326	10 22.4	+59 42		
327	10 23.0	+79 57		
328	10 23.8	+72 32		

No.	Position 1950		D	S
	h m	o '		
329	10 23.9	+67 13		
330	10 25.0	+68 43		
331	10 26.8	+70 18		
332	10 26.9	+65 34		
333	10 27.7	+78 04		
334	10 28.3	+60 58		
335	10 29.8	+67 51		
336	10 32.3	+79 50		
337	10 33.1	+62 58		
338	10 33.7	+71 27		
339	10 34.6	+64 33		
340	10 37.9	+65 39		
341	10 38.6	+77 45		
342	10 38.9	+63 16		
343	10 40.0	+79 16		
344	10 42.3	+78 43		
345	10 42.9	+68 38		
346	10 45.3	+66 37		
347	10 46.5	+65 47		
348	10 47.8	+66 16		
349	10 47.8	+77 51		
350	10 49.0	+67 02		
351	10 52.1	+65 43		
352	10 53.4	+60 58		
353	10 54.0	+58 21		
354	10 54.2	+58 02		

No.	Position 1950		D	S
	h m	o '		
355	10 54.7	+ 59 31		
356	10 54.8	+ 67 16		
357	10 55.5	+ 66 17		
358	10 55.8	+ 57 46		
359	10 57.9	+ 65 13		
360	10 58.0	+ 58 03		
361	10 59.5	+ 65 44		
362	10 59.8	+ 65 46		
363	11 00.0	+ 65 45		
364	11 00.2	+ 68 29		
365	11 00.8	+ 70 42		
366	11 03.4	+ 61 46		
367	11 03.5	+ 76 58		
368	11 04.0	+ 67 08		
369	11 04.2	+ 61 44		
370	11 04.2	+ 69 48		
371	11 05.1	+ 58 48		
372	11 05.3	+ 58 48		
373	11 05.7	+ 79 16		
374	11 06.5	+ 60 39		
375	11 07.0	+ 72 30		
376	11 07.2	+ 60 33		
377	11 07.8	+ 57 55		
378	11 09.8	+ 57 33		
379	11 09.9	+ 58 37		
380	11 10.2	+ 58 37		

No.	Position 1950		D	S
	h m	o '		
381	11 10.3	+57 16		
382	11 10.7	+61 18		
383	11 11.1	+64 13		
384	11 14.0	+59 49		
385	11 15.5	+61 42		
386	11 17.6	+60 25		
387	11 17.7	+66 03		
388	11 18.2	+56 57		
389	11 18.6	+66 35		
390	11 18.9	+66 58		
391	11 19.2	+66 02		
392	11 19.2	+67 30		
393	11 19.4	+57 07		
394	11 19.6	+67 27		
395	11 19.7	+57 07		
396	11 20.2	+67 23		
397	11 20.8	+56 42		
398	11 21.8	+60 13		
399	11 22.5	+60 14		
400	11 22.5	+64 04		
401	11 23.5	+62 15		
402	11 24.6	+61 44		
403	11 24.6	+79 16		
404	11 25.6	+63 13		
405	11 27.3	+58 43		
406	11 28.0	+80 35		

No.	Position 1950		D	S
	h m	o '		
407	11 29.2	+71 06		
408	11 29.8	+73 18		
409	11 30.1	+57 23		
410	11 32.1	+79 05		
411	11 33.2	+70 57		
412	11 33.6	+70 27		
413	11 34.8	+63 38		
414	11 35.3	+67 46		
415	11 35.9	+58 10		
416	11 38.2	+69 23		
417	11 38.8	+71 50		
418	11 40.6	+63 28		
419	11 40.8	+64 16		
420	11 41.5	+74 09		
421	11 42.8	+59 15		
422	11 45.7	+65 28		
423	11 49.0	+69 35		
424	11 49.1	+60 07		
425	11 50.2	+64 02		
426	11 50.6	+70 43		
427	11 52.9	+58 53		
428	11 53.0	+64 46		
429	11 53.0	+80 31		
430	11 53.6	+58 30		
431	11 54.7	+58 50		
432	11 57.8	+56 34		

No.	Position 1950		D	S
	h m	o '		
433	11 59.5	+66 40		
434	11 59.6	+59 27		
435	12 01.5	+65 22		
436	12 01.8	+57 01		
437	12 03.3	+79 48		
438	12 04.5	+78 19		
439	12 04.7	+67 31		
440	12 04.9	+57 02		
441	12 06.9	+62 26		
442	12 10.9	+57 03		
443	12 12.3	+64 44		
444	12 12.4	+59 36		
445	12 13.8	+60 46		
446	12 14.8	+69 41		
447	12 15.1	+71 05		
448	12 16.1	+57 31		
449	12 19.2	+63 15		
450	12 19.9	+57 09		
451	12 20.3	+76 28		
452	12 22.4	+61 11		
453	12 22.9	+61 57		
454	12 23.0	+65 13		
455	12 23.5	+66 31		
456	12 23.7	+61 56		
457	12 25.1	+78 12		
458	12 25.7	+63 48		

No.	Position 1950		D	S
	h m	o '		
459	12 26.1	+62 15		
460	12 27.3	+65 49		
461	12 27.5	+71 14		
462	12 28.0	+64 12		
463	12 28.2	+76 56		
464	12 29.1	+66 00		
465	12 29.8	+65 30		
466	12 29.8	+66 40		
467	12 30.0	+66 40		
468	12 30.4	+66 41		
469	12 30.7	+73 43		
470	12 31.0	+67 24		
471	12 31.9	+77 59		
472	12 32.8	+66 39		
473	12 32.9	+59 19		
474	12 32.9	+72 14		
475	12 33.7	+81 53		
476	12 36.7	+61 03		
477	12 37.0	+59 42		
478	12 37.2	+59 44		
479	12 40.2	+63 31		
480	12 40.8	+63 33		
481	12 41.2	+56 56		
482	12 43.3	+60 27		
483	12 43.7	+71 35		
484	12 44.9	+58 03		

No.	Position 1950		D	S
	h m	o '		
485	12 45.6	+67 39		
486	12 49.7	+66 57		
487	12 49.9	+67 00		
488	12 52.0	+74 17		
489	12 53.8	+71 06		
490	12 54.1	+57 09		
491	12 54.4	+62 23		
492	12 56.8	+59 32		
493	12 57.3	+79 02		
494	12 57.5	+61 25		
495	12 59.5	+71 57		
496	13 00.5	+80 17		
497	13 01.7	+65 17		
498	13 03.4	+70 31		
499	13 04.5	+67 59		
500	13 08.6	+59 31		
501	13 09.0	+84 53		
502	13 09.9	+76 09		
503	13 10.9	+57 13		
504	13 12.8	+77 04		
505	13 13.2	+61 44		
506	13 13.6	+62 24		
507	13 13.8	+61 45		
508	13 16.2	+58 14		
509	13 19.0	+84 46		
510	13 21.2	+61 17		

No.	Position 1950		D	S
	h m	o '		
511	13 21.5	+70 47		
512	13 21.8	+57 45		
513	13 24.4	+57 43		
514	13 25.0	+84 47		
515	13 25.2	+61 24		
516	13 25.8	+65 48		
517	13 28.3	+73 25		
518	13 29.0	+75 50		
519	13 30.8	+78 06		
520	13 30.9	+60 23		
521	13 31.3	+60 23		
522	13 39.1	+60 43		
523	13 40.6	+62 04		
524	13 44.6	+70 20		
525	13 48.9	+71 17		
526	13 49.0	+70 31		
527	13 49.0	+71 24		
528	13 50.4	+64 38		
529	13 50.7	+62 40		
530	13 51.1	+76 24		
531	13 51.8	+78 30		
532	13 52.8	+68 48		
533	13 54.3	+64 57		
534	14 06.5	+73 08		
535	14 09.6	+62 58		
536	14 09.8	+63 26		

No.	Position 1950		D	S
	h m	o '		
537	14 10.3	+63 28		
538	14 12.0	+68 55		
539	14 12.6	+63 47		
540	14 12.9	+63 46		
541	14 14.5	+63 01		
542	14 14.7	+63 08		
543	14 17.7	+67 25		
544	14 17.9	+58 06		
545	14 17.9	+67 29		
546	14 18.4	+67 34		
547	14 18.8	+71 49		
548	14 20.0	+76 00		
549	14 25.6	+61 25		
550	14 26.7	+58 24		
551	14 26.9	+70 10		
552	14 28.2	+57 30		
553	14 30.6	+79 05		
554	14 30.7	+59 28		
555	14 35.1	+77 05		
556	14 35.4	+73 44		
557	14 37.5	+73 13		
558	14 37.7	+69 18		
559	14 37.8	+80 26		
560	14 38.8	+60 53		
561	14 42.0	+57 39		
562	14 42.9	+73 07		

No.	Position 1950		D	S
	h m	o '		
563	14 43.0	+72 08		
564	14 46.0	+69 47		
565	14 48.6	+57 30		
566	14 51.5	+63 17		
567	14 51.6	+60 20		
568	14 51.6	+76 52		
569	14 52.0	+67 45		
570	14 52.1	+67 41		
571	14 53.8	+66 30		
572	14 54.2	+71 43		
573	14 54.8	+68 42		
574	14 54.8	+77 41		
575	14 56.8	+75 28		
576	14 59.6	+74 05		
577	15 00.5	+75 15		
578	15 01.0	+67 13		
579	15 04.3	+60 51		
580	15 04.4	+62 08		
581	15 05.0	+74 10		
582	15 05.0	+82 06		
583	15 05.4	+60 46		
584	15 07.5	+69 07		
585	15 08.1	+61 25		
586	15 09.1	+69 35		
587	15 10.5	+61 08		
588	15 11.0	+64 11		

No.	Position 1950		D	S
	h m	o '		
589	15 11.9	+ 58 21		
590	15 13.0	+ 63 05		
591	15 14.1	+ 61 23		
592	15 16.4	+ 66 47		
593	15 17.5	+ 56 41		
594	15 17.7	+ 59 15		
595	15 18.0	+ 59 17		
596	15 18.6	+ 73 06		
597	15 19.2	+ 62 32		
598	15 20.3	+ 78 05		
599	15 21.5	+ 66 49		
600	15 22.4	+ 61 27		
601	15 22.9	+ 79 41		
602	15 23.8	+ 62 31		
603	15 24.1	+ 60 25		
604	15 26.4	+ 58 02		
605	15 27.6	+ 57 47		
606	15 27.8	+ 59 21		
607	15 28.1	+ 57 02		
608	15 31.0	+ 59 04		
609	15 32.2	+ 58 55		
610	15 32.9	+ 60 09		
611	15 33.0	+ 57 28		
612	15 33.5	+ 57 48		
613	15 34.8	+ 58 58		
614	15 35.5	+ 56 53		

No.	Position 1950		D	S
	h m	o '		
615	15 35.7	+ 59 33		
616	15 37.0	+ 62 36		
617	15 38.1	+ 61 38		
618	15 42.0	+ 78 25		
619	15 42.5	+ 67 33		
620	15 43.3	+ 58 03		
621	15 43.3	+ 62 40		
622	15 47.0	+ 59 56		
623	15 47.8	+ 69 37		
624	15 49.1	+ 61 14		
625	15 49.2	+ 58 53		
626	15 51.9	+ 61 21		
627	15 52.5	+ 74 20		
628	15 53.7	+ 63 11		
629	15 54.6	+ 67 10		
630	15 56.3	+ 77 30		
631	15 57.0	+ 20 55		
632	16 01.5	+ 62 37		
633	16 01.6	+ 66 02		
634	16 01.8	+ 58 00		
635	16 02.0	+ 58 03		
636	16 06.0	+ 82 01		
637	16 09.2	+ 64 06		
638	16 13.7	+ 63 23		
639	16 14.2	+ 57 50		
640	16 14.6	+ 62 50		

No.	Position 1950		D	S
	h m	o '		
641	16 15.2	+61 27		
642	16 15.2	+66 34		
643	16 16.2	+74 20		
644	16 21.0	+86 10		
645	16 23.4	+60 32		
646	16 24.1	+68 19		
647	16 24.5	+66 23		
648	16 26.4	+79 33		
649	16 28.0	+75 00		
650	16 31.8	+64 17		
651	16 33.4	+64 00		
652	16 34.1	+60 15		
653	16 36.0	+85 36		
654	16 37.6	+60 58		
655	16 40.6	+57 53		
656	16 41.6	+62 59		
657	16 42.5	+61 40		
658	16 43.7	+58 03		
659	16 47.2	+67 46		
660	16 51.6	+66 16		
661	16 52.1	+57 26		
662	16 52.6	+68 12		
663	16 52.9	+64 32		
664	16 54.2	+67 34		
665	16 54.3	+70 10		
666	16 54.5	+63 32		

No.	Position 1950		D	S
	h m	o '		
667	16 55.1	+63 18		
668	16 55.8	+60 43		
669	16 56.8	+68 28		
670	16 57.6	+57 36		
671	16 59.4	+64 41		
672	16 59.6	+68 29		
673	17 01.0	+83 57		
674	17 01.5	+61 02		
675	17 01.6	+67 09		
676	17 02.4	+59 47		
677	17 04.7	+71 30		
678	17 05.7	+72 12		
679	17 05.8	+69 14		
680	17 06.2	+66 59		
681	17 07.8	+63 42		
682	17 08.3	+64 39		
683	17 08.8	+64 19		
684	17 09.0	+66 29		
685	17 10.5	+63 43		
686	17 10.6	+64 31		
687	17 10.7	+64 05		
688	17 10.8	+63 42		
689	17 11.0	+64 14		
690	17 11.2	+76 55		
691	17 11.4	+63 41		
692	17 11.4	+64 25		

No.	Position 1950		D	S
	h m	o '		
693	17 11.6	+67 18		
694	17 12.0	+64 05		
695	17 12.4	+63 46		
696	17 12.8	+64 08		
697	17 13.7	+72 28		
698	17 13.7	+72 34		
699	17 14.4	+63 04		
700	17 14.5	+57 30		
701	17 14.5	+64 04		
702	17 16.0	+64 12		
703	17 16.9	+64 19		
704	17 17.0	+61 12		
705	17 18.0	+57 25		
706	17 18.0	+62 53		
707	17 18.0	+68 47		
708	17 18.4	+68 18		
709	17 19.0	+65 47		
710	17 22.0	+77 06		
711	17 22.7	+68 45		
712	17 24.6	+58 52		
713	17 24.7	+60 03		
714	17 25.5	+59 21		
715	17 27.2	+74 33		
716	17 27.5	+67 06		
717	17 28.0	+77 21		
718	17 29.4	+65 59		

No.	Position 1950		D	S
	h m	o '		
719	17 30.2	+65 56		
720	17 31.3	+60 00		
721	17 31.6	+59 54		
722	17 33.0	+59 37		
723	17 33.7	+68 35		
724	17 33.7	+72 11		
725	17 34.3	+62 30		
726	17 34.5	+66 05		
727	17 35.6	+63 05		
728	17 36.0	+67 22		
729	17 36.0	+86 47		
730	17 36.2	+67 47		
731	17 37.4	+76 35		
732	17 38.5	+68 04		
733	17 39.9	+68 29		
734	17 40.6	+68 30		
735	17 41.4	+67 56		
736	17 42.0	+66 33		
737	17 42.0	+67 59		
738	17 42.5	+68 23		
739	17 44.1	+64 24		
740	17 44.3	+61 55		
741	17 46.5	+67 23		
742	17 47.3	+68 38		
743	17 47.4	+64 28		
744	17 48.0	+83 09		

No.	Position 1950		D	S
	h m	o '		
745	17 48.1	+67 58		
746	17 48.2	+69 05		
747	17 48.6	+61 42		
748	17 48.6	+66 42		
749	17 48.7	+66 13		
750	17 53.6	+65 48		
751	17 54.8	+68 03		
752	17 55.3	+68 39		
753	17 55.6	+65 47		
754	17 55.8	+65 21		
755	17 56.5	+62 36		
756	17 56.6	+65 13		
757	17 56.8	+68 03		
758	17 57.4	+69 19		
759	17 58.5	+66 38		
760	17 59.6	+69 13		
761	17 59.7	+70 33		
762	18 01.2	+61 33		
763	18 03.4	+58 00		
764	18 04.4	+66 55		
765	18 05.0	+59 45		
766	18 05.3	+66 54		
767	18 06.1	+61 35		
768	18 07.3	+69 50		
769	18 09.0	+62 23		
770	18 09.1	+58 22		

No.	Position 1950		D	S
	h m	o '		
771	18 09.3	+61 25		
772	18 09.4	+61 33		
773	18 12.0	+61 19		
774	18 12.1	+60 51		
775	18 12.1	+73 02		
776	18 12.2	+69 55		
777	18 12.4	+60 30		
778	18 13.0	+68 19		
779	18 13.7	+58 53		
780	18 15.4	+58 17		
781	18 15.4	+76 20		
782	18 16.0	+72 22		
783	18 17.0	+59 42		
784	18 17.9	+58 17		
785	18 19.4	+66 17		
786	18 20.1	+57 59		
787	18 20.8	+60 53		
788	18 20.8	+63 22		
789	18 21.7	+61 36		
790	18 21.9	+66 35		
791	18 22.7	+59 48		
792	18 23.2	+62 15		
793	18 25.2	+73 09		
794	18 25.5	+67 57		
795	18 25.6	+67 07		
796	18 25.8	+67 23		
797	18 26.0	+61 23		

No.	Position 1950		D	S
	h m	o '		
798	18 26.1	+ 57 55		
799	18 26.1	+ 60 25		
800	18 26.5	+ 72 07		
801	18 26.7	+ 60 09		
802	18 27.9	+ 57 44		
803	18 27.9	+ 57 47		
804	18 28.2	+ 58 05		
805	18 29.0	+ 57 28		
806	18 29.5	+ 60 06		
807	18 30.5	+ 59 20		
808	18 30.8	+ 62 31		
809	18 30.9	+ 58 33		
810	18 31.5	+ 59 27		
811	18 31.8	+ 59 25		
812	18 32.9	+ 59 51		
813	18 33.1	+ 68 56		
814	18 33.6	+ 67 06		
815	18 33.7	+ 66 34		
816	18 34.0	+ 80 07		
817	18 34.3	+ 71 32		
818	18 34.6	+ 57 52		
819	18 34.9	+ 58 45		
820	18 34.9	+ 62 41		
821	18 35.0	+ 62 49		
822	18 35.3	+ 59 51		
823	18 36.7	+ 63 42		

No.	Position 1950		D	S
	h m	o '		
824	18 37.0	+63 41		
825	18 37.6	+60 15		
826	18 38.1	+60 30		
827	18 40.5	+71 00		
828	18 40.7	+61 30		
829	18 40.9	+68 18		
830	18 41.7	+61 28		
831	18 42.1	+61 22		
832	18 42.2	+61 25		
833	18 42.8	+64 44		
834	18 43.7	+62 00		
835	18 44.1	+66 45		
836	18 44.6	+60 43		
837	18 45.0	+68 17		
838	18 45.5	+79 43		
839	18 48.2	+77 44		
840	18 49.7	+77 24		
841	18 50.2	+64 11		
842	18 50.4	+64 14		
843	18 50.4	+73 16		
844	18 50.5	+64 28		
845	18 50.7	+63 33		
846	18 51.4	+73 18		
847	18 52.2	+64 23		
848	18 53.7	+68 25		
849	18 53.9	+68 19		

No.	Position 1950		D	S
	h m	o '		
850	18 56.2	+72 07		
851	18 57.8	+65 08		
852	18 58.0	+65 27		
853	18 58.0	+66 30		
854	19 00.3	+65 30		
855	19 01.0	+77 02		
856	19 02.7	+63 47		
857	19 04.0	+67 45		
858	19 04.4	+65 24		
859	19 06.6	+76 44		
860	19 08.3	+78 00		
861	19 09.0	+65 54		
862	19 10.6	+63 45		
863	19 11.5	+72 53		
864	19 11.5	+73 20		
865	19 11.8	+68 09		
866	19 12.0	+66 03		
867	19 12.2	+65 18		
868	19 15.6	+69 40		
869	19 16.4	+67 17		
870	19 16.6	+64 13		
871	19 16.7	+64 57		
872	19 17.2	+65 57		
873	19 18.1	+68 43		
874	19 18.3	+67 07		
875	19 18.4	+67 47		

No.	Position 1950		D	S
	h m	o '		
876	19 18.4	+68 44		
877	19 19.2	+68 33		
878	19 19.7	+63 13		
879	19 19.8	+76 49		
880	19 22.0	+63 04		
881	19 23.7	+67 05		
882	19 24.0	+78 57		
883	19 25.9	+62 39		
884	19 26.9	+61 50		
885	19 27.5	+66 24		
886	19 28.3	+65 24		
887	19 28.3	+67 42		
888	19 28.9	+65 43		
889	19 28.9	+66 44		
890	19 29.4	+67 35		
891	19 30.0	+67 40		
892	19 30.1	+62 42		
893	19 30.9	+63 36		
894	19 31.0	+83 56		
895	19 31.5	+63 24		
896	19 31.7	+63 22		
897	19 34.2	+68 49		
898	19 35.3	+58 10		
899	19 36.4	+62 23		
900	19 37.0	+59 13		
901	19 37.9	+60 29		

No.	Position 1950		D	S
	h m	o '		
902	19 38.6	+57 53		
903	19 38.8	+60 52		
904	19 39.6	+61 02		
905	19 39.7	+61 44		
906	19 41.3	+63 57		
907	19 41.7	+71 52		
908	19 41.9	+71 49		
909	19 42.8	+65 04		
910	19 43.2	+67 12		
911	19 43.3	+60 48		
912	19 43.4	+63 37		
913	19 44.6	+61 19		
914	19 45.4	+66 23		
915	19 46.3	+59 47		
916	19 48.6	+65 33		
917	19 48.9	+66 05		
918	19 49.2	+71 26		
919	19 49.9	+59 39		
920	19 52.3	+62 55		
921	19 54.0	+62 14		
922	19 57.4	+61 39		
923	19 57.7	+61 05		
924	20 01.0	+85 57		
925	20 02.3	+60 10		
926	20 07.6	+62 24		
927	20 08.9	+62 24		

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928	20 10.0	+84 08		
929	20 15.0	+79 15		
930	20 15.3	+78 47		
931	20 17.7	+62 32		
932	20 18.8	+79 33		
933	20 23.0	+62 38		
934	20 25.9	+60 20		
935	20 30.4	+60 05		
936	20 48.8	+63 44		
937	20 52.2	+66 13		
938	21 14.0	+87 42		
939	21 48.0	+84 02		
940	21 54.4	+74 15		
941	23 28.0	+85 18		